National Grid
Syracuse, New York

OPERATIONS, MAINTENANCE, MONITORING AND SITE MANAGEMENT PLAN
TROY-WATER STREET AREA 4-UPLAND SITE
TROY, NEW YORK

May 2007
NGRD.001.001.05

CONTENTS

APPENDICIES

FIGURES

TABLES

SECTION 1

INTRODUCTION

This Operations, Maintenance, Monitoring and Site Management Plan, hereto referenced as the "Plan", has been prepared in accordance with the requirements of the Order on Consent and the NYSDEC-approved Remedial Design for the Troy-Water Street former manufactured gas plant site, Area 4, located in Troy, New York. The implementation of this Plan will provide a mechanism to monitor the continued effectiveness of the remedial action that commenced in April 2003 and was substantially completed in January 2006. The plan outlines the post-remediation care, maintenance and monitoring procedures that will be implemented at the Troy-Area 4 site. The plan includes descriptions of:

Final cover system/remedy inspections and maintenance;
Environmental Monitoring; and
Record keeping and reporting

The Troy-Water Street former manufactured gas plant site, area 4-upland site (Area 4) is located in Troy, New York. The site comprises approximately 8.5 acres. A site location map is included as Figure 1-1. The site straddles the boundary between the City of Troy and the Town of North Greenbush with 1.8 acres and 6.7 acres respectively, in each municipality and is owned by Rensselaer County. Area 4 is approximately 2800 feet long and is bordered by the Hudson River to the west, a railroad spur owned by CSX Transportation to the east, a former asphalt batch plant owned by Chevron USA, Inc. to the north, and the Rensselaer County Publicly Owned Treatment Works (POTW) to the south. An access road to the POTW runs along the east side of Area 4.

Remedial construction, as described in the Record of Decision, commenced in April 2003 and was substantially completed in January 2006. The remedy includes the following components:

Engineered Cap
Run-off Controls
Retaining Wall System
Deed Restrictions Limiting Future Development
Tar Weep Removal from the Hudson River
Tar Impacted Soil Removal from Peripheral Areas
Tar Impacted Soil Removal from Area 4
Cap/Geosynthetic Barrier Placed Over Tar-impacted Soils in the Peripheral Area
Site Security Measures, and

Environmental Monitoring

The remedy components that require Operations, Maintenance, and Monitoring (OM&M) include the following:

Engineered Cap

Run-off Controls

Retaining Wall System, and

Site Security Features (i.e., fence, gates, etc.)

In addition, Environmental Monitoring will be conducted to evaluate the continued effectiveness of the remedy.

Each of the above-referenced post construction/remedy care is covered in more detail in the following sections of this plan.

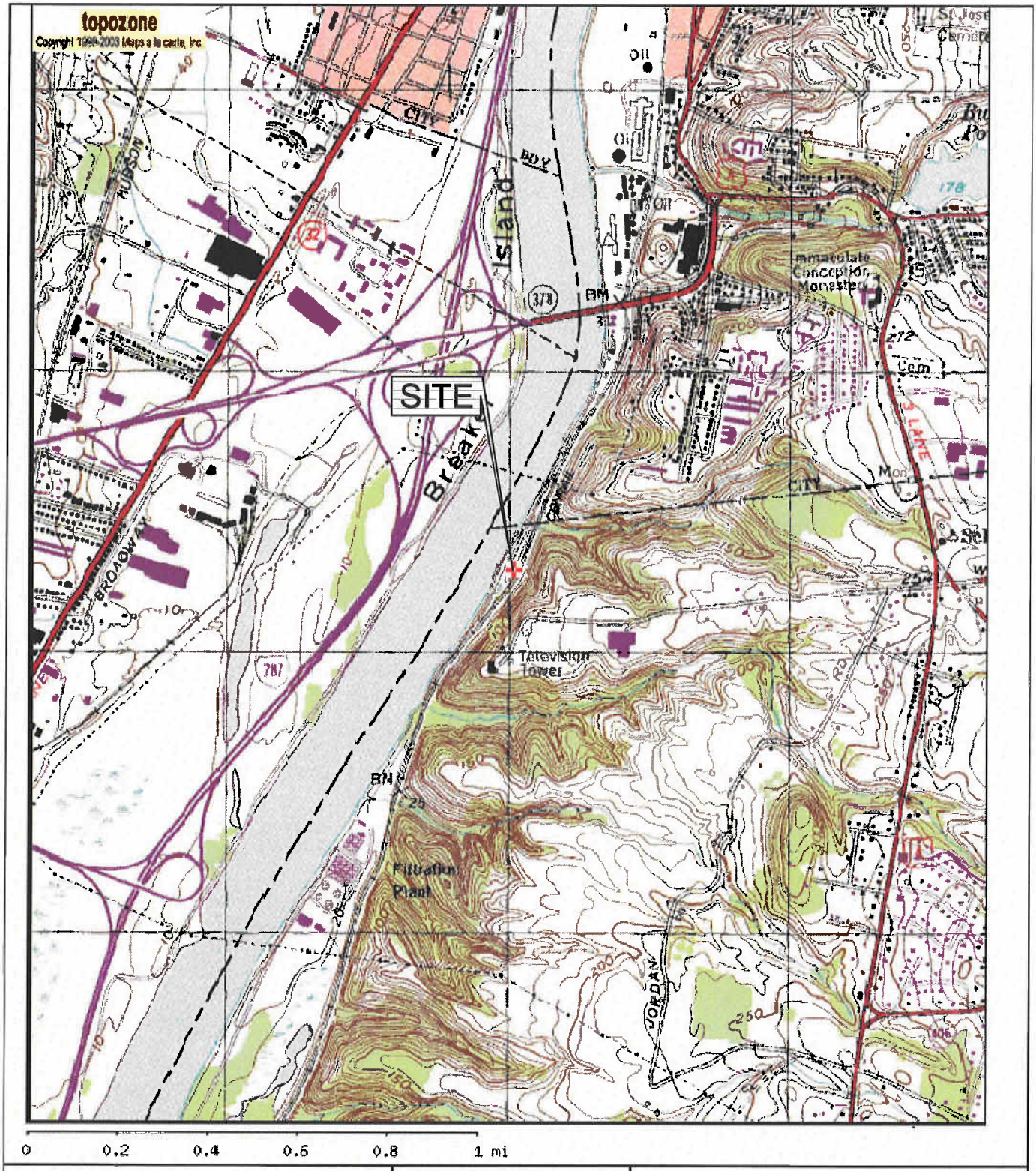


FIGURE 1-1
SITE LOCATION MAP

NIAGARA MOHAWK POWER CORPORATION
TROY – WATER ST. FORMER
MANUFACTURED GAS PLANT SITE

Environmental
Engineers & Scientists
HYDROQUAL
ENVIRONMENTAL
ENGINEERS & SCIENTISTS, P.C.
1200 MACARTHUR BOULEVARD
MAHWAH, NEW JERSEY 07430

SECTION 2

OM&M MANAGEMENT

In accordance with the Consent Order and ROD for the site, National Grid (NG) is responsible for the maintenance and monitoring of the Area-4 which includes observing and repairing (as necessary) the following:

- Final Cover;
- Run-Off Controls;
- Retaining Wall System;
- Site Security Features (fence, gates, etc.); and
- Peripheral Areas

The maintenance and monitoring tasks associated with the Area 4 remedy will be managed by a National Grid Project Manager (PM). The PM will contract an environmental engineering firm/contractor to conduct the monitoring, inspections and maintenance at the site. The NG project manager will be responsible for items as follows:

- OM&M Contract Management
- Oversight of the Contractors
- Coordination with the NYSDEC
- Record Keeping, and
- Reporting

The environmental engineer/contractor will be responsible for items as follows:

- Coordination with the NG Project Manager
- Site Inspections
- Completion of Site Inspection Form/Checklist
- Environmental Monitoring/Groundwater Monitoring
- Coordination with the Analytical Laboratory
- Data Review
- Preparation of Data Usability Summary Report, as described in Section 6
- Maintenance of the Site as directed by the NG Project Manager
- Coordination with utility companies for intrusive work, if required

Personnel involved with monitoring and maintenance activities will be informed of the importance of both preventive and routine maintenance inspections at the site, and will have the appropriate experience in performing O&M activities at sites similar to Troy Area 4 and will possess the credentials to perform the work activities at Troy Area 4. Site personnel involved with the Plan activities that require intrusive work must have completed 40 hours, and associated 8 hour refresher, of hazardous materials training including medical monitoring pursuant to 29 CFR 1910.120. Contractors/consultants involved with the Plan activities are solely responsible for the health and safety of their employees/workers and will be responsible for the preparation of a CIH-certified site-specific Health and Safety Plan (HASP), in accordance with 29 CFR 1910 and 29 CFR 1926. A HASP specification is contained in Appendix H that contains the minimum components of the site-specific HASP to be prepared by the contractor to conduct intrusive activities at the site.

SECTION 3

SITE OPERATION AND MAINTENANCE

This section describes the operation and maintenance that will be performed on the site features, as follows:

Engineered cap
Run-off controls
Retaining wall system
Peripheral Areas
Site security features (fence, gates, etc.)

A "Site Inspection Check-List" is provided to document the routine inspections of the above site features. The check-list is provided as Table 3-1. An inspection schedule is provided as Table 3-2, which describes the frequency of O&M inspections. As referenced in the Preliminary Site Operations and Maintenance Plan, dated October 2002, prepared by O'Brien & Gere Engineers, Inc., inspection will be conducted on a quarterly basis during the first year and semi-annually thereafter. In addition, during the first year (i.e., following remedial construction) the site will be inspected after major storm events (i.e., two-inches or greater of rainfall in a 24-hour period).

3.1 ENGINEERED CAP

The cap system components are summarized as follows (in ascending order):

16 oz geotextile (cushion geotextile above the subbase soil layer)
40 mil textured LLDPE geomembrane
Triplanar geocomposite drainage layer
Geogrid
Barrier protection soil layer
6-inches top soil, erosion control blanket and vegetation (above elevation 25.0)

In areas of the cap that are below elevation 25.0, the topmost layer is comprised of a geotextile directly above the barrier soil and overlain by 24 inches of rip rap.

The final cover/cap system details are included as Figures 3-1 and 3-2. A plan view of the site showing the limits of the various surface components is included in Appendix A.

As referenced above the surface components of the engineered cap consist of medium Rip Rap or vegetative cover (top soil, erosion control blanket and grasses) as shown in the site plan (Appendix A) and Figures 3-1 and 3-2.

3.1.1 Inspection

Routine inspection of the capped area and immediately adjacent areas (i.e., peripheral areas) will be performed quarterly during the first year, following the establishment of vegetation, and semi-annually thereafter. NYSDEC will be informed of the inspections at least one week in advance to enable the Department's participation if it chooses. The inspector will observe the condition of the cover for evidence of thinning vegetation or other signs of vegetation stress, burrowing animals, settlement, erosion, rip-rap movement, slope instability, large weeds, brush or tree growth, or other damage to the capped area.

3.1.2 Maintenance

Vegetated areas which appear to be thinning out over time will be overseeded to maintain a uniform vegetative cover.

Deep rooting shrubs, brush, or trees will not be allowed to establish on the cap. Mowing will be performed in the vegetated areas of the cap to prevent the establishment of plants (trees) that may affect the integrity of the cover. Should plants root in the Rip Rap areas of the cap, the plants will be cut and the root system removed or treated with herbicide, as necessary.

If burrowing animals or signs of the presence of burrowing animals are observed within the limits of the capped area, live traps will be set. The captured animals will be relocated off the capped area and any holes produced by the animals will be filled with like existing materials.

Should areas of settlement, erosion, Rip Rap movement, or slope instability be noted, regrading and/or restoration will be conducted to repair the affected areas, promote drainage, minimize erosion, and minimize percolation of water into the cover.

3.2 RUN-OFF CONTROL

The surface water drainage system is designed to promote surface water run-off caused by seasonal precipitation and snowmelt events. The surface water drainage system is sized to facilitate a 25-year, 24-hour storm event. Run-off is directed to the Hudson River by a series of drainage swales and downchutes. The downchute areas are lined with geotextile beneath gabion mattresses. Swale and downchute locations are shown on the site plan, contained in Appendix A.

3.2.1 Inspection

Run-off controls, including swales, ditches, catchbasins (along road) and downchutes will be inspected at the same frequency as the cover (referenced above). Drainage facilities will be inspected for settlement, displacement, accumulation of debris and obstructions,

including silt and vegetation (weeds) that may inhibit flow, and for erosion of the swales and downchutes. In addition to the run-off controls, the 69-inch culvert that runs beneath/through the site will be inspected to maintain a free-flowing pipe to limit run-on from upland areas adjacent to the site. The location of the 69-inch culvert is shown on the site plan.

3.2.2 Maintenance

Debris and obstructions found in the drainage features will be removed to maintain flow capacity. If scouring or erosion is noted, the area will be repaired and additional channel protection materials installed, as necessary. Where swales and slopes are vegetated, the vegetation will be inspected and maintained as described in Section 3.1.2 of this plan.

3.3 RETAINING WALL SYSTEM

The retaining wall system includes a total of 640 feet of soldier pile wall and 2080 feet of gabion baskets. The height of the soldier pile retaining walls varies from approximately elevation 9.0 feet to 16.0 feet mean sea level (MSL) and the top of the gabion wall is at approximately 8.5 MSL. The locations and limits of the retaining walls are shown on the site plan (Appendix A).

3.3.1 Inspection

The retaining walls will be inspected at the same frequency as the engineered cap for signs/evidence of structural damage, settlement, or displacement. The inspector will look for signs of cracks in the concrete lagging panels, deterioration of the steel piles, alignment changes, damaged gabion baskets, settlement and/or undermining. The rip rap wedge located on the river side of the retaining wall system will be inspected for signs of movement or displacement of stones.

3.3.2 Maintenance

Damaged sections of the concrete lagging will be replaced or repaired promptly following the inspection. Damaged gabion baskets or baskets that have settled or are undermined will be repaired or replaced, as needed. Displaced stones within the stone wedge (adjacent to the gabion baskets) will be reinstalled/adjusted, as needed.

3.4 SITE SECURITY FEATURES

A chain link fence provides site security and runs along the eastern boundary of the site (i.e., along the western edge of Water Street). The fence is installed to discourage access to the site by unauthorized personnel. Signs are posted every 200 feet along the fence and at the locked entry points (i.e., gates) to notify unauthorized personnel that the site is restricted. The gates will be locked when the site is unattended.

3.4.1 Inspection

A site security inspection will be conducted at the same frequency as the engineered cap. The inspections will focus on the condition of the fence, gates, locks and evidence of unauthorized entry on the site.

3.4.2 Maintenance

Breaches in the integrity of the fence, gates or locks will be repaired promptly. Missing or damaged signs will be replaced or repaired. The locks and gates will be lubricated twice annually.

3.5 PERIPHERAL AREA

The "peripheral area" as defined in the Record of Decision includes the POTW access roadway (i.e., Water Street and CSX transportation property). The peripheral area begins on the southern end of the site at Station 0+00 and terminates at the northern limit of the site at Station 27+26 (i.e., the northern limit of the soldier pile wall). In addition, the peripheral area includes the intertidal zone. The intertidal zone is the area between the retaining walls/rip rap wedge and the low tide elevation (i.e., Hudson River bottom exposed during low tide). Within the eastern peripheral area (i.e., from the CSX row to the eastern limit of the site) several underground utility pipes are present, as described in Appendix G of this plan.

3.5.1 Inspection

Routine inspection of the peripheral areas will be performed at the same frequency as the cover (referenced above). As outlined in Table 3-2 Inspection Schedule, the peripheral areas (i.e., east of the site to the CSX right-of-way (ROW) including Water Street and the intertidal zone) will be inspected for signs of new tar weeps. Should a tar weep be identified, the inspector will document the location on a site map and mark the location in the field (paint or stakes).

3.5.2 Maintenance

Based on the location of a tar weep, options will be evaluated to address the issue. Options may include removal, or cover/capping. Depending on the option selected, and approved by the NYSDEC, the appropriate permits and agreements will be obtained as necessary. As an example, a weep identified between the site and the CSX ROW (i.e., within Water Street) may require a road opening permit, revised traffic control plan, notification and coordination with the POTW or CSX, etc. A tar weep identified in the intertidal zone may require area specific permits or notifications (e.g., USACOE, NYSDEC, Fish and Wildlife, etc.). Interim measures may be implemented as appropriate. Interim measures may

include items such as removal of surface tar materials and installation of temporary cover materials (i.e., soil, liner, asphalt, etc.) until the selected permanent option can be implemented.

3.6 BIKE TRAIL

At the request of the NYSDEC and the Rensselaer Hudson Greenway Trail Advisory Committee, National Grid installed the sub-base for a bike trail at the Troy Area 4 Site. The bike trail traverses the center portion of the site. The trail is 4 feet wide and approximately 1150 feet long. The alignment of the bike trail is shown on Figure 1. The sub-base of the bike trail consists of compacted crushed stone. National Grid will do OM&M on the sub-base portion of the trail until such time that construction is completed by others.

3.6.1 Inspection

Routine inspection of the bike trail will be performed at the same frequency and in conjunction with the engineers cap.

3.6.2 Maintenance

Maintenance associated with the bike trail will be conducted as described in Section3.1.2. of this plan.

TABLE 3-1
TROY AREA 4 - WATER ST. FORMER MGP SITE
TROY , NY
OPERATIONS, MAINTENANCE, AND MONITORING PLAN
SITE INSPECTION FORM / CHECKLIST

Date	Weather Conditions	Inspector

Item Inspected	Response		Describe Unsatisfactory Conditions	Proposed Corrective Actions
	Yes	No		
Final Cover - Vegetation				
Erosion of Soils	☐	☐		
Deterioration of Vegetation	☐	☐		
Wet Spots / Ponding	☐	☐		
Mowing Required	☐	☐		
Presence of Burrowing Animals	☐	☐		
Evidence of Vandalism	☐	☐		
Final Cover - Rip-Rap				
Movement / Displacement	☐	☐		
Weeds / Trees	☐	☐		
Evidence of Vandalism	☐	☐		
Surface Drainage Inlets (Roads)				
Free of Debris	☐	☐		
Free Flowing	☐	☐		
69" Culvert Inlet				
Free of Debris	☐	☐		
Free Flowing	☐	☐		
Evidence of Vandalism	☐	☐		
Drainage System - Swales				
Obstruction of Flow	☐	☐		
Ponding	☐	☐		
Erosion	☐	☐		
Evidence of Vandalism	☐	☐		
Diversion System - Downchutes				
Obstruction of Flow	☐	☐		
Erosion	☐	☐		
Evidence of Structural Damage	☐	☐		
Soldier Pile Wall				
Concrete Lagging Panels Damage	☐	☐		
Steel Pile Damage	☐	☐		
Displacement / Settlement	☐	☐		
Evidence of Vandalism	☐	☐		

TABLE 3-1
TROY AREA 4 - WATER ST. FORMER MGP SITE
TROY , NY
OPERATIONS, MAINTENANCE, AND MONITORING PLAN
SITE INSPECTION FORM / CHECKLIST

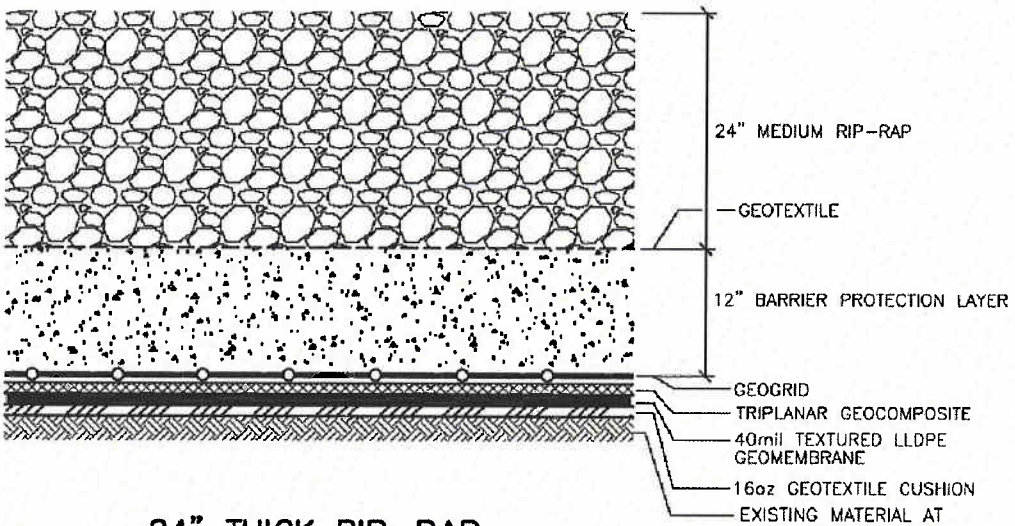
Date	Weather Conditions	Inspector

Item Inspected	Response		Describe Unsatisfactory Conditions	Proposed Corrective Actions
	Yes	No		
Gabion Wall				
Wire Basket Damage	☐	☐		
Stone Fill Displacement	☐	☐		
Settlement or Undermining	☐	☐		
Alignment Change	☐	☐		
Sediment Buildup Behind Wall	☐	☐		
Rip Rap Wedge Displacement	☐	☐		
Evidence of Vandalism	☐	☐		
Monitoring Wells				
Locks Intact	☐	☐		
Hinged Cover Inplace	☐	☐		
Well / Protective Casing Damage	☐	☐		
Surface Seal Intact	☐	☐		
Evidence of Vandalism	☐	☐		
Security				
Fence Damage	☐	☐		
Gate Damage	☐	☐		
Locks Inplace	☐	☐		
Signs Inplace	☐	☐		
Evidence of Vandalism	☐	☐		
Water Street				
Evidence of Tar Weeps	☐	☐		
Intertidal Zone				
Evidence of Tar Weeps	☐	☐		
Miscellaneous Items or Comments				

TABLE 3-2
TROY AREA 4 - WATER ST. FORMER MGP SITE
TROY, NY
OPERATIONS, MAINTENANCE AND MONITORING PLAN
INSPECTION SCHEDULE

AREA	SPECIFIC ITEM	TYPES OF PROBLEMS	FREQUENCY OF INSPECTION
Final Cover	Cover, Vegetation	Erosion of Soils, Deterioration of Vegetation, Wet spots, Burrowing Animals, Vandalism	Quarterly (Year 1)* Semi-annually (Thereafter)
	Rip-Rap	Movement / Displacement, Weeds, Trees, Debris	Quarterly (Year 1)* Semi-annually (Thereafter)
Stormwater Runoff Control System	Drainage Swales	Obstruction of Flow, Bank Erosion, Ponding, Vegetation Stress, Debris, Vandalism	Quarterly (Year 1)* Semi-annually (Thereafter)
	Downchutes	Obstruction of Flow, Bank Erosion, Ponding, Scour at Inlet or Outlet, Debris, Vandalism	Quarterly (Year 1)* Semi-annually (Thereafter)
	Culverts, Pipes, and Inlets	Obstruction of Flow, Ponding, Scour at Inlet or Outlet, Debris, Vandalism	Quarterly (Year 1)* Semi-annually (Thereafter)
Retaining Walls	Concrete Lagging	Alignment, Cracks, Tampering	Quarterly (Year 1)* Semi-annually (Thereafter)
	Steel Piles	Rust, Deterioration	Quarterly (Year 1)* Semi-annually (Thereafter)
	Gabion Baskets	Damage to Baskets, Settlement, Alignment, Vandalism	Quarterly (Year 1)* Semi-annually (Thereafter)
	Rip Rap Wedge	Movement / Displacement of Stones	Quarterly (Year 1)* Semi-annually (Thereafter)
Security Devices	Facility Gates	Corrosion, Damage to Chain-Link Fence, Rust, Vandalism	Quarterly (Year 1) Semi-annually (Thereafter)
	Locks	Tampering, Rust	Quarterly (Year 1) Semi-annually (Thereafter)
	Facility Fences	Corrosion, Damage to Chain-Link Fence or Hinges, Rust, Vandalism	Quarterly (Year 1) Semi-annually (Thereafter)
	Warning Signs	Missing, Damaged, Tampering	Quarterly (Year 1) Semi-annually (Thereafter)
Groundwater Monitoring Wells (Above Ground)	Locks	Tampering, Rust	When Sampled
	Foundation Concrete	Cracking, Pitting, Flaking	When Sampled
	Hinged Cover	Tampering, Holes	When Sampled
	Well / Protective Casing	Degradation of Pipe	When Sampled
Peripheral Area	Cover, Asphalt	Damage, Tar Weeps	Quarterly (Year 1) Semi-annually (Thereafter)
Intertidal Zone	Exposed River Bottom	Tar Weeps	Quarterly (Year 1) Semi-annually (Thereafter)

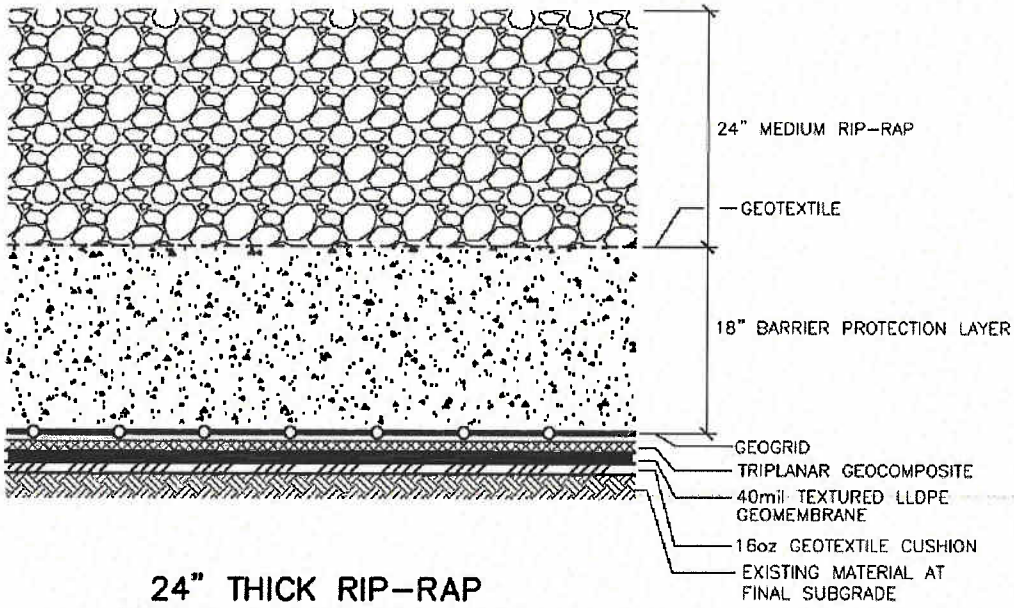
* During the first year the site will be inspected following major storm events, as described in Section 3 of this plan.



24" THICK RIP-RAP CAP CROSS SECTION DETAIL

(BELOW ELEV. 25.0 – 1V:3H SLOPE)

NOT TO SCALE



24" THICK RIP-RAP CAP CROSS SECTION DETAIL

(BELOW ELEV. 25.0 – 1V:2H SLOPE)

NOT TO SCALE

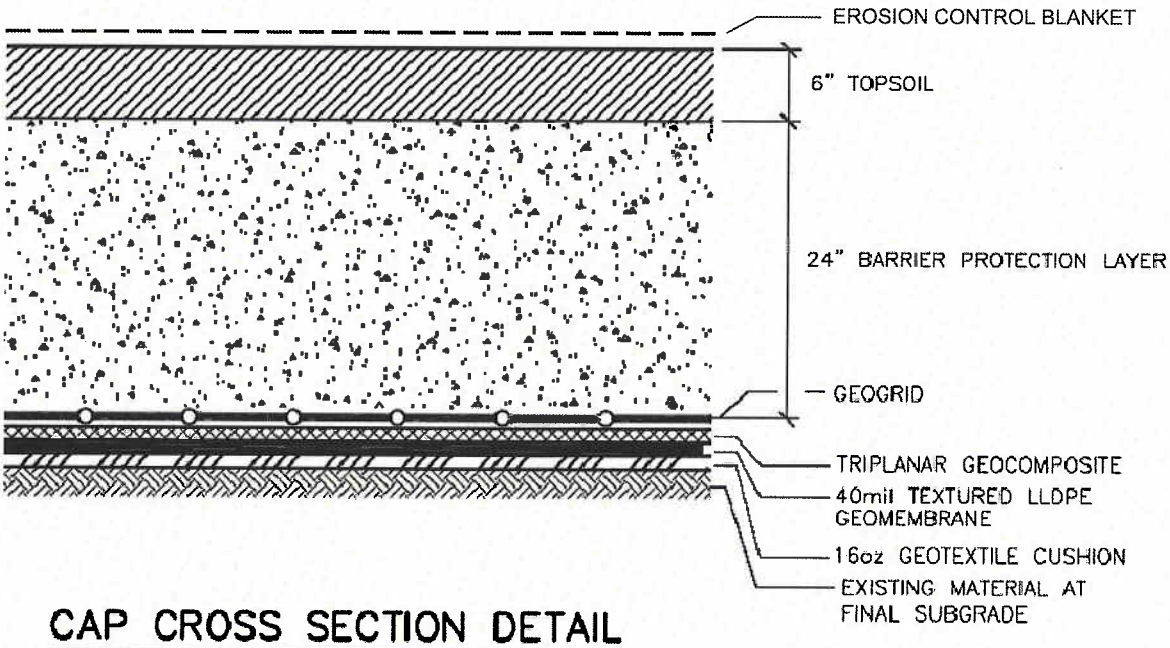
Environmental Engineers & Scientists

HYDROQUAL ENVIRONMENTAL ENGINEERS & SCIENTISTS, P.C.

1200 MACARTHUR BOULEVARD
MAHWAH, NEW JERSEY 07430

FIGURE 3-1
FINAL COVER SYSTEM DETAILS (BELOW ELEVATION 25.0)

NIAGARA MOHAWK POWER CORPORATION
TROY – WATER ST. FORMER
MANUFACTURED GAS PLANT SITE



CAP CROSS SECTION DETAIL

NOT TO SCALE

Environmental Engineers & Scientists

HYDROQUAL ENVIRONMENTAL ENGINEERS & SCIENTISTS, P.C.
1200 MACARTHUR BOULEVARD
MAHWAH, NEW JERSEY 07430

FIGURE 3-2
FINAL COVER SYSTEM DETAILS (ABOVE ELEVATION 25.0)

NIAGARA MOHAWK POWER CORPORATION
TROY – WATER ST. FORMER
MANUFACTURED GAS PLANT SITE

SECTION 4

SITE MANAGEMENT

This section has been prepared to describe procedures for maintaining the safety of the public, workers and the environment in the event intrusive work is required at the Troy-Water Street Area 4 Site.

4.1 INTRUSIVE WORK PROCEDURES

Prior to starting intrusive work the contractor is required to contact the National Grid Project Manager and the NYSDEC as described in Section 3 of Appendix G and prepare a site-specific HASP. Required procedures for intrusive work through the final cover system area are as follows:

- Stakeout and field verify the location of all utilities in the work area
- Strip cover soil or rip rap and stockpile for reuse/reinstallation
- Strip barrier protection soils and stockpile, in accordance with soil erosion and sediment control requirements, for future reuse/reinstallation
- Expose geogrid layer using hand tools
- Contract a certified, authorized geosynthetic installer to remove the geosynthetic components of the final cover system in the intrusive work area
- Intrusive work areas shall not be larger than the minimum required to perform the work. The allowable limits of intensive work shall be verified by a geotechnical stability analysis prior to start of work. Such geotechnical analysis shall include measures to maintain the stability of the cap throughout the period of time required to complete the work and under any reasonable weather condition that may be encountered during the work.
- Conduct excavation activities
- Excavate soils handling/management. Based on the remedial activities conducted at the site it is unlikely that tar-impacted soil would be encountered, if however, visually identified tar-impacted soils (i.e., soils that exhibit tar, appear oil saturated, discolored, stained or exhibit elevated volatile organic vapors) are encountered these materials must be placed in a container for characterization and disposal by National Grid. Acceptable containers for the storage of impacted soil are New York State Department of Transportation (NYSDOT) approved 55-gallon drums, roll-offs, or dump truck beds. With the exception of 55-gallon drums, containers shall be lined with polyethylene sheeting prior to placement of soil. In addition, each container shall be covered with a lid (55-gallon drum) or canvas cover that is secured. The excavated material may be temporarily stored on and covered by plastic sheeting

until acceptable containers can be delivered to the site. Temporarily stored material shall be placed in an area where surface water can be diverted away from the stockpiled materials. Leakage from the stockpiled material storage area is prohibited. National Grid shall be contacted to coordinate soil characterization, manifesting, and disposal. No material shall be removed from the site without written approval from National Grid.

- Backfill, excavation area, with removed materials or import comparable fill materials meeting the original material specifications. Compact backfill materials in 12-inch lifts
- Place 4-inch (minimum) of sand over compacted backfill
- Replace geosynthetic layers of the final cover in accordance with the manufacturer's recommendations using an authorized, certified geosynthetics installer.
- Replace barrier protection soil. Barrier protection soil shall be replaced and compacted in 12-inch lifts. Materials will be deemed adequately compacted based on non-movement under the load of compaction equipment
- Replace cover soil and/or rip rap
- Apply seed and mulch in disturbed topsoil areas of the site.

4.2 DEWATERING

Contaminated water (i.e., water in direct contact with tar-impacted soil) or watergenerated during intrusive activities shall be containerized by those conducting the work activities for subsequent characterization and disposal by National Grid. Acceptable containers for water storage would be NYSDOT-approved 55-gallon drums, high density polyethylene tanks, frac tanks, or approved equal. The water may be temporarily pumped into any watertight container and then transferred into acceptable containers for disposal. Uncontaminated water (i.e., water from above the geosynthetics of the cap, or not in direct contact with visually identified tar-impacted soils) that are encountered may be pumped directly to the surface water drainage features and shall meet the New York State Soil Erosion and Sediment Control Standards prior to discharge to a surface water body.

4.3 DUST CONTROL

Dust control shall be provided during the soil excavation activities to mitigate the migration of dust off site. Dust control shall incorporate wetting work areas and haul roads or use of appropriate controls as necessary.

4.4 AIR MONITORING

Air monitoring is required for both worker and community protection. Air monitoring shall include monitoring volatile organic vapors and dust/particulate matter. Air monitoring shall be conducted in conformance with the site-specific HASP and shall

incorporate community air monitoring to be conducted in conformance with the New York State Department of Health Generic Community Air Monitoring Plan. Should odorous materials be encountered the contract shall implement odor suppressant measures, such as installation of cover soils, tarps or application of odor suppressant form

4.5 HEALTH AND SAFETY

Contractors conducting excavation activities at the site are required to perform the work activities in conformance with a site-specific CIH-certified HASP, to be prepared by the contractor and are solely responsible for the health and safety of their workers and/or subcontractors. The site-specific HASP shall be prepared in accordance with the applicable rules and regulations included in 29 CFR 1910 and 29 CFR 1926. The HASP may include a corporate/company-established HASP identifying company health and safety practices and procedures; however, the HASP must also include a description of site-specific hazards and protective measures (including personal protective equipment) associated with the activities to be conducted within the area of intrusive work. A HASP specification is included in Appendix H for use by the contractor as reference in preparing the site-specific HASP.

SECTION 5

INSTITUTIONAL CONTROLS

The ROD calls for the imposition of deed restrictions to limit future site development. The restrictions will include (i) notification to the NYSDEC and NYSDOH for utility or other excavation work; (ii) prohibition of land development for residential use; (iii) notification to the NYSDEC prior to any action that could jeopardize the integrity of the remedy, and (iv) the prohibition of the development of water supply wells on the site.

SECTION 6

POST-CONSTRUCTION GROUNDWATER MONITORING

The objective of the groundwater monitoring program is to assess groundwater flow conditions at the site and evaluate the presence and extent of BTEX and PAHs in the groundwater.

6.1 GROUNDWATER ELEVATION MONITORING

The groundwater flow conditions at the site will be assessed by a groundwater elevation monitoring program. The water level in each monitoring well will be measured to provide information on groundwater elevations and flow at the site. Groundwater elevation measurements will be recorded to the nearest 0.01 foot from the top of each well casing using an electronic water level indicator. Groundwater elevation monitoring locations are shown on the attached site plan (Appendix A) and consist of the following monitoring wells:

MW-1A
MW-2A
MW-3A
MW-11
MW-13
MW-15
MW-16

The groundwater monitoring well construction logs for the above wells are attached in Appendix B of this plan.

6.2 GROUNDWATER SAMPLING

As referenced above, groundwater sampling will be conducted to evaluate the presence and extent of BTEX and PAHs in the groundwater. Sample locations, methods, parameters, frequency, and laboratory requirements are described in the following sections of this plan.

6.2.1 Sampling Locations, Methods and Frequency

As described in the remedial design report, Section 7.1, dated October 2002, groundwater samples will be obtained from existing monitoring wells MW-1A, MW-2A, MW-3A, MW-11, MW-13, MW-15, and MW-16. Sample collection will be performed in accordance with detailed procedures described in NG's Generic Field Sampling plan, attached in Appendix C of this plan. Each monitoring well will be purged by removing a

minimum of three well volumes or at least one volume of saturated sand pack, whichever is greater. Samples will be collected using Teflon, stainless steel or dedicated polyethylene bailers. Temperature, pH and conductivity will be measured and recorded on the groundwater sampling field log.

Two rounds of groundwater sampling will be conducted from each of the wells at least two months apart. The purpose of the second round of samples is to verify the results obtained during the first round.

Following interpretation of the two rounds of analytical data, further groundwater sampling activities will be evaluated. Recommendations for subsequent sampling/analytical parameters will be based on the first two rounds of sampling. A Sampling and Analysis Plan will be submitted to the Department for approval, following evaluation of the results of the first two rounds of sampling.

6.2.2 Analytical Parameters and Methods

The analytical program for the site is designed for the identification of MGP constituents. The Generic Quality Assurance Project Plan (attached in Appendix D) presents the analytical methods and quality control objectives.

In accordance with the ROD (Section B) groundwater samples collected during both sampling rounds will be analyzed for benzene, toulene, ethylbenzene, xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) as defined in the NYSDEC Analytical Service Protocol (ASP), (attached in Appendix E) (current version). The groundwater sample analysis will be conducted using NYSDEC ASP Methods (current version) and Category B Deliverables (Attached in Appendix E).

A complete set of QA/QC samples, including matrix spikes, matrix spike duplicates, field blank, field duplicate, blind duplicates and equipment blanks (if non-disposable sampling equipment is used) will be collected.

Laboratory analytical data will be used to assess groundwater quality and the presence of BTEX and PAHs. Analytical data will be compared to New York State Class GA Standards and Guidance Values, as appropriate (Attached in Appendix F).

6.2.3 Protocols and Deliverables

Laboratory analysis of environmental samples will be conducted in accordance with NYSDEC ASP-CLP protocols (Attached in Appendix E) and Category B Deliverables will be provided. A data usability summary report (DUSR) will be prepared following review and evaluation of the analytical data. The DUSR includes documentation of the samples and analysis parameters reviewed. Data deficiencies, analytical method protocol deviations and quality control problems are described and their effects on the data discussed. In addition,

the DUSR identifies data gaps caused by non-compliant or rejected data, and indicates what steps have been or will be taken to fill these gaps.

SECTION 7

RECORDS, RECORD KEEPING AND REPORTING

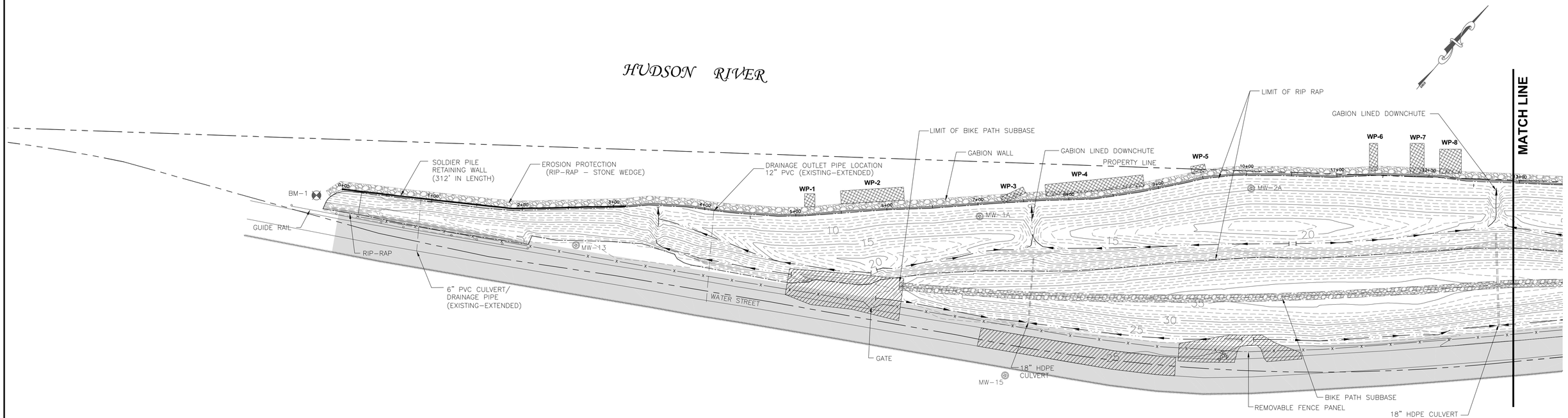
A variety of forms included in this OM&M Plan will be used to document inspections and monitoring events at the site. Records will be organized and maintained by the NG project manager and kept by NG for a period of at least seven years from the time in which they were generated including:

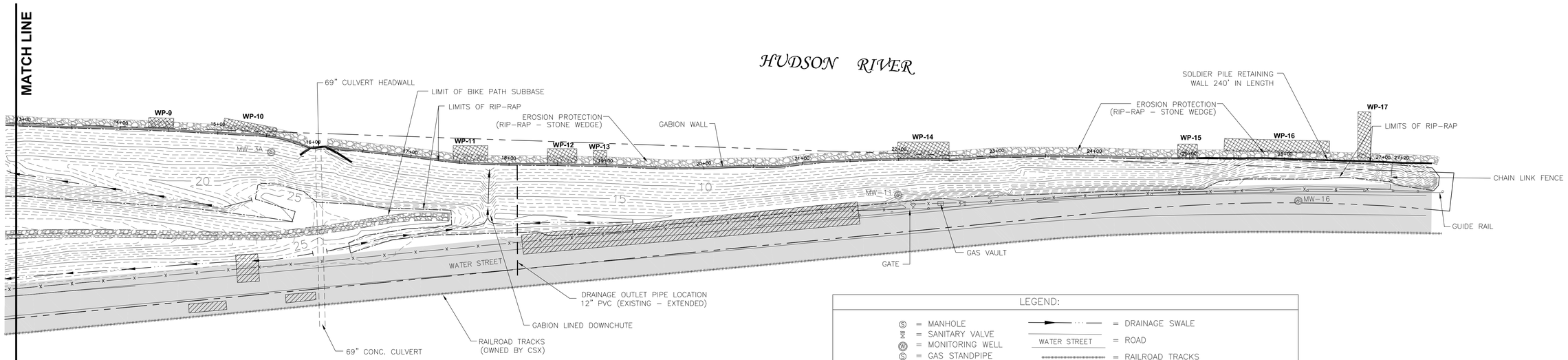
- Site inspection form/checklist;
- Sample log sheet;
- Chain of custody;
- Corrective action request form;
- Laboratory reports;
- Monitoring report; and
- DUSR

NG will prepare quarterly and annual reports. The report will include a summary of the maintenance activities. The report will include a summary of changes, if any, to the approved plans, reports or permit conditions and the justification thereof. Groundwater laboratory analytical data will be submitted to the NYSDEC with the subsequent monthly report and therefore will not be resubmitted in the annual report.

APPENDIX A

SITE PLAN





LEGEND:

- (S) = MANHOLE
- (SV) = SANITARY VALVE
- (MW) = MONITORING WELL
- (S) = GAS STANDPIPE
- 15+00 = SITE STATIONING
- = RIP RAP WEDGE
- —15— = FINAL GRADE
- = UTILITY CORRIDOR
- = GABION RETAINING WALL
- = SOLDIER PILE RETAINING WALL
- = DRAINAGE SWALE
- WATER STREET = ROAD
- = RAILROAD TRACKS
- = GUIDE RAIL
- = FENCE
- = PROPERTY LINE
- = LIMIT OF RIP RAP (FLOOD PROTECTION)
- BM-1 = BENCHMARK
- = GEOMEMBRANE BARRIER (UTILITY CORRIDOR))
- WP-2 = REMOVED TAR WEEP LOCATION AND ID

50 0 50 100
scale feet

NOTES:

1. TOPOGRAPHY AND SITE FEATURES PROVIDED BY VAN DUSEN & STEVES LAND SURVEYORS, JANUARY 4, 2006.
2. GEOMEMBRANE BARRIER (UTILITY CORRIDOR) LOCATIONS BASED ON FIELD MEASUREMENT OBTAINED, BY HYDROQUAL ENGINEERS AND SCIENTISTS, PC DURING INSTALLATION. SEE RESTORATION DETAILS, DRAWING No. 13.
3. BENCH MARK (BM-1) AT ELEVATION 11.95', RAILROAD SPIKE IN COTTONWOOD TREE.
4. GRADES DEPICTED REPRESENT FINAL SITE ELEVATIONS FOLLOWING REMEDIAL CONSTRUCTION.
5. SEE RECORD SURVEY - EXCAVATION LIMITS (SHEET 2) FOR HARD TAR AREAS.

REV. NO.	DESCRIPTION OF REVISION	APPROVAL	DATE
△			
△			
△			
△			
△			
△			
△			

SEAL:

Gary J. DiPippo, P.E. DATE:
NY P.E. LICENSE NO. 055964-1

DATE: 5/29/07
SCALE: AS SHOWN
CAD FILE NO.:
DESIGNED BY: PDM
DRAWN BY: AG
CHECKED BY: GDP

HydroQual
HYDROQUAL ENVIRONMENTAL ENGINEERS AND SCIENTISTS, P.C.
1200 MACARTHUR BOULEVARD
MAHWAH, NEW JERSEY 07430
(201) 529-5151 F: 529-5728

RECORD DRAWINGS
FOR THE
TROY - WATER STREET
AREA 4 - UPLAND SITE
SITE PLAN
TROY, NEW YORK

PROJECT NO. NGRD.001.001.04
DRAWING NO. 1

\\MEADOWLANDS\109\NATIONAL_GRID\CERT_REPORT\FINAL DRAFT RECORD DWGS_MARCH_2007\DRAWING-1.DWG 06/01/2007 LAYOUT DRAWING-1

APPENDIX B

GROUNDWATER MONITORING WELL CONSTRUCTION LOGS

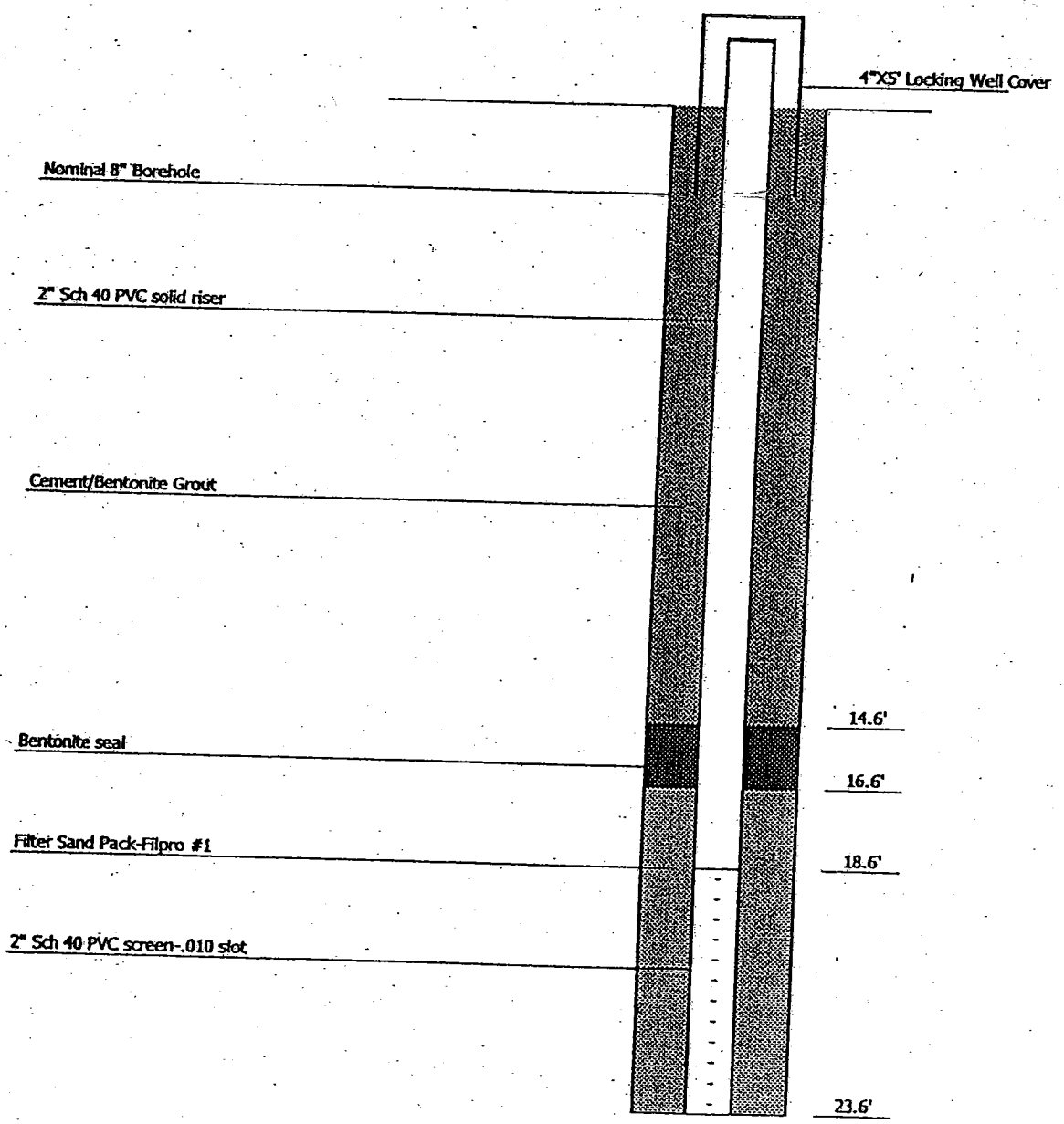
Aquifer Drilling & Testing, Inc.
9 Monroe Street
Troy, NY 12180

518-274-3949
Fax 274-3989

MONITORING WELL DETAIL

PROJECT: Water Street Site
LOCATION: Troy, NY
CLIENT: D.A. Collins
WELL NO.: MW-1A

Date Started: 7-21-04
Date Well Completed: 7-21-04



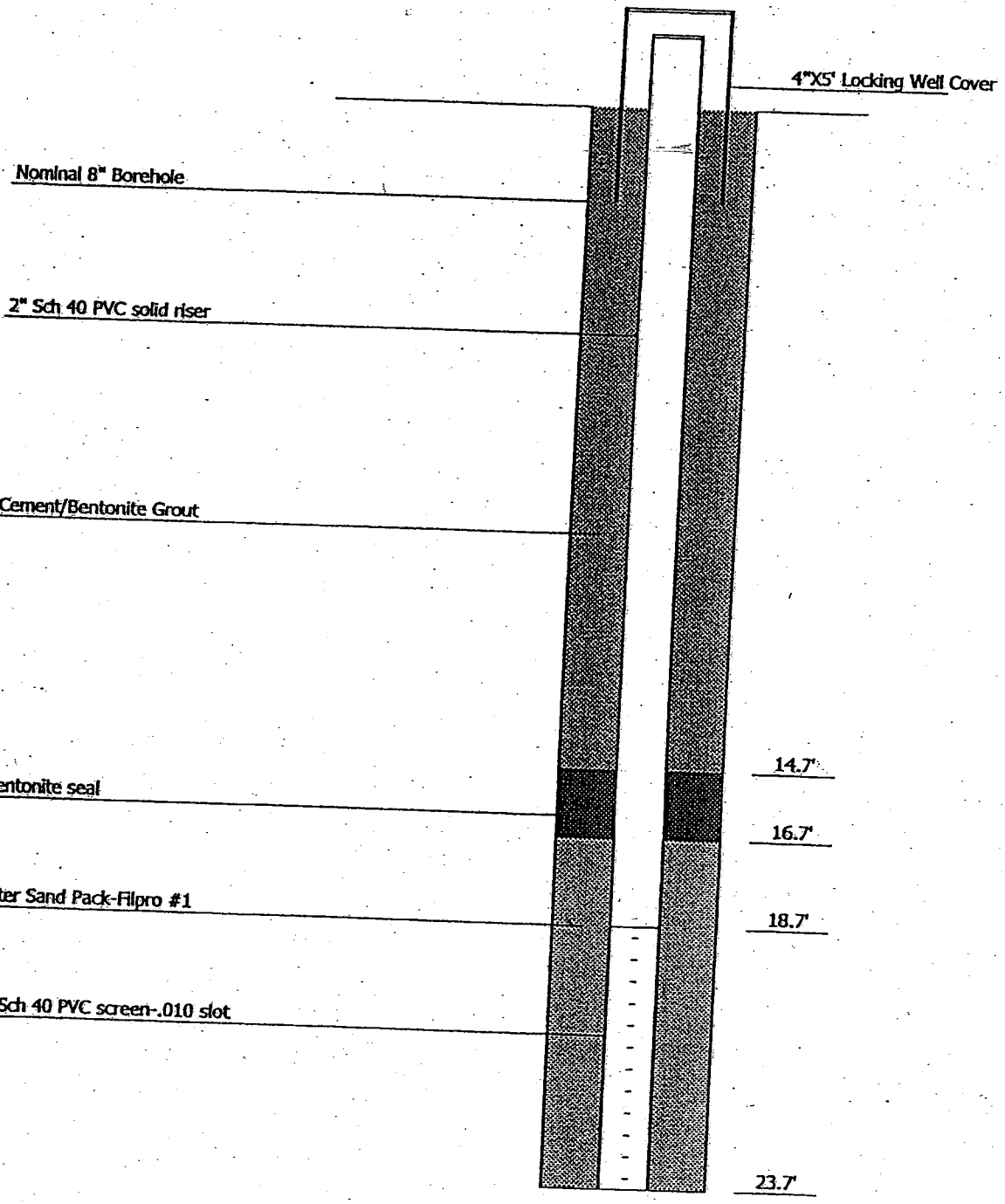
Aquifer Drilling & Testing, Inc.
9 Monroe Street
Troy, NY 12180

518-274-3949
Fax 274-3989

MONITORING WELL DETAIL

PROJECT: Water Street Site
LOCATION: Troy, NY
CLIENT: D.A. Collins
WELL NO.: MW-2A

Date Started: 7-20-04
Date Well Completed: 7-20-04



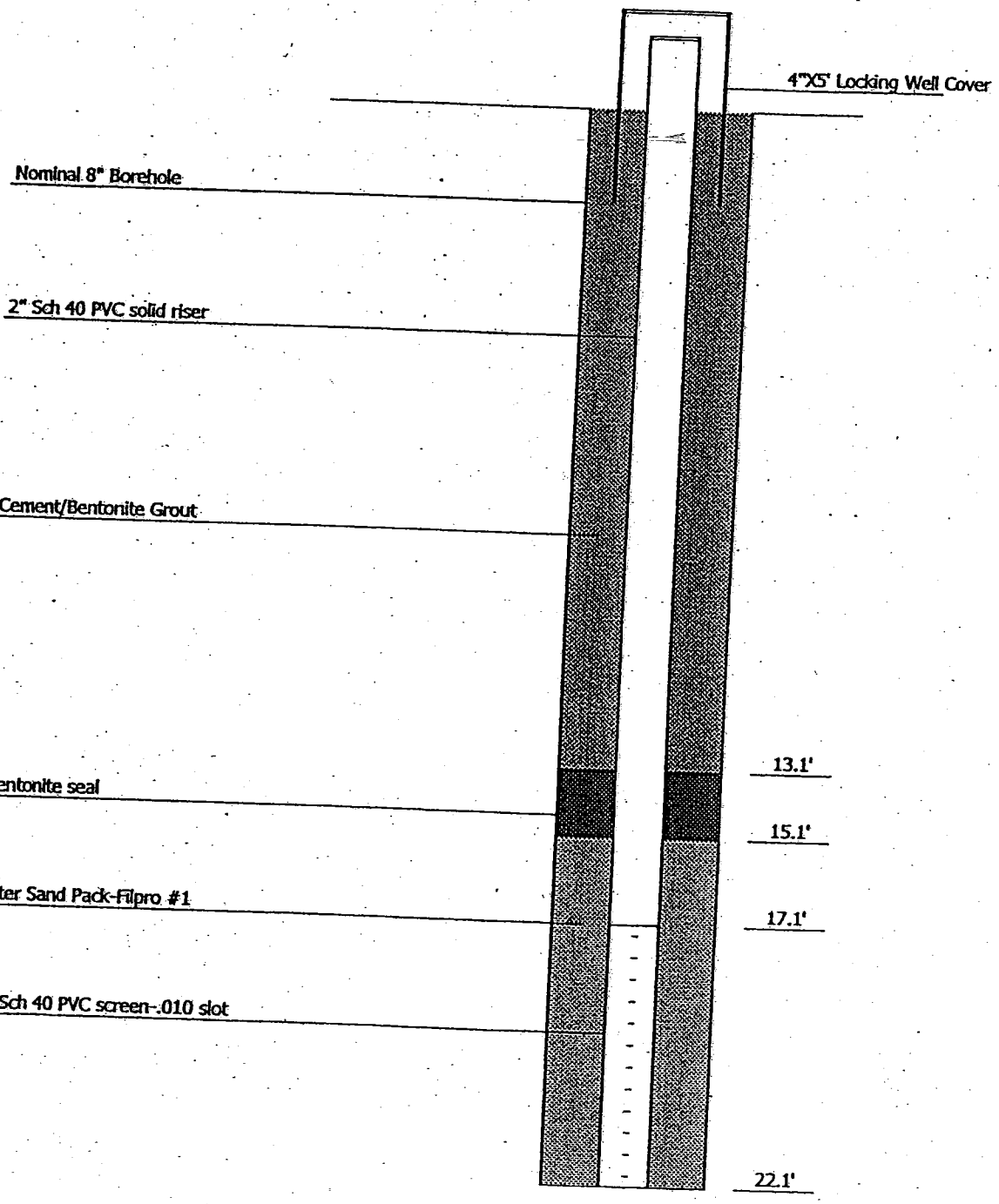
Aquifer Drilling & Testing, Inc.
9 Monroe Street
Troy, NY 12180

518-274-3949
Fax 274-3989

MONITORING WELL DETAIL

PROJECT: Water Street Site
LOCATION: Troy, NY
CLIENT: D.A. Collins
WELL NO.: MW-3A

Date Started: 7-20-04
Date Well Completed: 7-20-04



GROUNDWATER TECHNOLOGY

Drilling Log

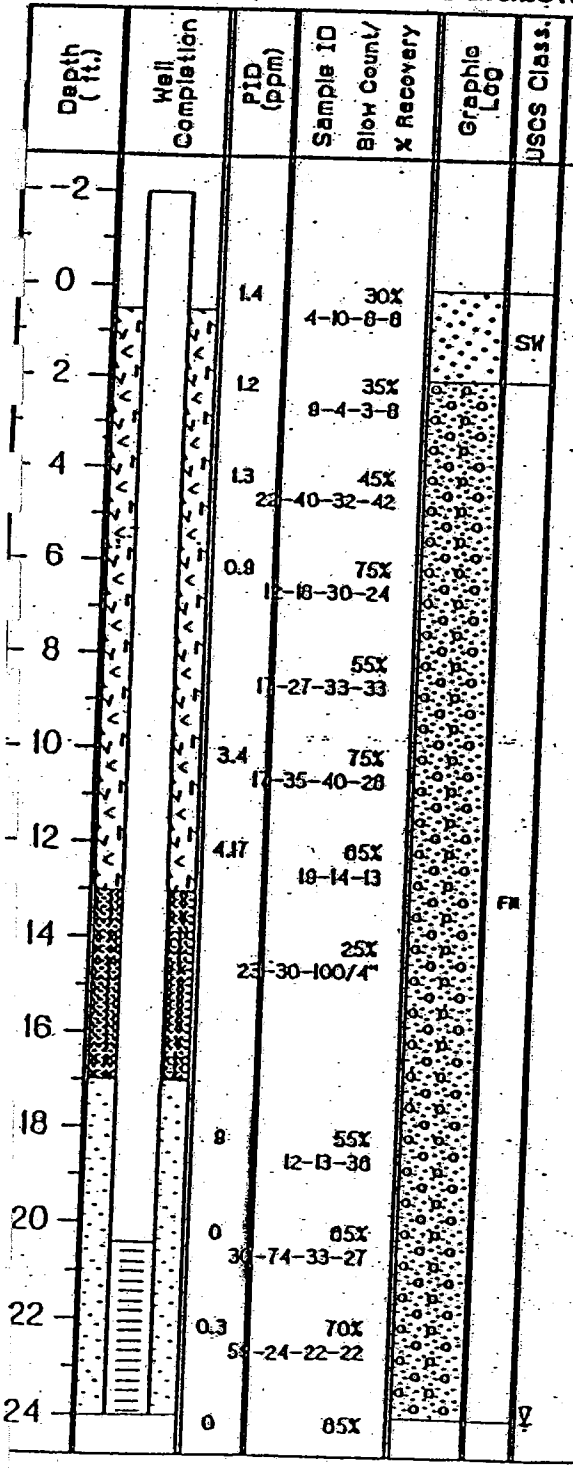
Monitoring Well MW-11

Project NIMO - Troy — Owner Niagara Mohawk
Location Water Street, Troy, New York — Proj. No. 0110-0037
Surface Elev. ____ Total Hole Depth 37.4 ft. Diameter 8 in.
Top of Casing ____ Water Level Initial 24 ft. Static 24.6 ft.
Screen: Dia 2 in. Length 15 ft. Type/Size PVC .010 in.
Casing: Dia 2 in. Length 25 ft. Type PVC
Fill Material #0 Morie Sand Rig/Core ATV B-57
Drill Co. ADT Method HSA
Driller M. Harrington Log By J. Bishop Date 9/8/94 Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

* = Sample sent for TCL/TAL. ** = Sample sent for MGP indicators. @ = Sample sent for geotechnicals. M = Sample sent for MS/MSD. D = Duplicate sample sent (67'-69')



Description

(Color, Texture, Structure)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%

0'-2': Top: Dry, tan, loose, FINE SAND, trace coarse sand; Bottom: Dry/slightly moist, dark brown, loose, FINE SAND, trace coarse sand, trace fine gravel

2'-4': Top: Dry, light brown, loose, FINE SAND, trace silt, trace coarse sand, septic odor; Bottom: Dry, black, compact, friable, charcoal like

4'-6': Same as above (bottom) some chalky white (gypsum)

*M6'-8': Same as above

@8'-10': Dry, dark brown, loose, FINE SAND

@10'-12': Same as above, but trace coarse gravel/cobble

**M12'-14': Same as above, but FINE SAND and COARSE SAND, trace fine-coarse gravel

14'-16': Wet, red/orange and black, loose, FINE GRAVEL and COARSE SAND, trace cobble, slag

Drilled to 18'

18'-20': Same as above, but moist red in spoon tip

20'-22': Same as above, but moist/wet

**D22'-24': Same as above, but red, moist, SLAG

GROUNDWATER TECHNOLOGY

Drilling Log

Monitoring Well MW-11

Project NIMO – Troy
Location Water Street, Troy, New York
Owner Niagara Mohawk
Proj. No. 0110-0037

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0	65% 25-15-13-8		FILL	24'–26': Same as above, but wet, saturated
26		1.0	65% 15-44-32-19		Slag	26'–28': Top: Wet, red/brown, loose, FINE SAND, some cobbles (SLAG), some fine gravel (SLAG), little coarse sand; Bottom: Wet, gray, loose; COARSE SAND and FINE GRAVEL, some fine sand, fine gravel, partly shale pieces
28		0.8	35% 10-10-15-16		GW	28'–30': Wet, dark gray, loose to slightly pliable, FINE SAND, little fine gravel (rounded), little coat (at top), trace silt, trace coarse sand, small shale chips
30			8% 23-45-50-100		GC	30'–32': Same as above, but no fine gravel, no clay
32		0.4	60% 69-51-70-69		SP	32'–34': Wet, gray, loose, COARSE SAND, some fine gravel, some fine sand, trace cobble, large cobble in tip, some small shale chips
34		0.9	2% 86-50/2" 3% 86-100-100/4		GW	34'–34.8': Wet, gray, compact, FINE SAND and FINE GRAVEL, trace silt, trace clay, till like 34.8'–36': Same as above
36		0.5	83-100-100/4			**36'–37.4': Same as above, bedrock at bottom– SHALE
38						End of boring.
40						
42						
4						
6						
8						
0						
2						
4						
6						

GROUNDWATER TECHNOLOGY

Drilling Log

Monitoring Well MW-13

Project NIMO - Troy — Owner Niagara Mohawk
Location Water Street, Troy, New York — Proj. No. 0110-0037
Surface Elev. ____ Total Hole Depth 28.9 ft. Diameter 8 in.
Top of Casing ____ Water Level Initial 20 ft. Static 24.3 ft.
Screen: Dia 2 in. Length 15 ft. Type/Size PVC .010 in.
Casing: Dia 2 in. Length 12 ft. Type PVC
Fill Material #0 Morie Sand Rig/Core ATV B-57
Drill Co. ADT Method HSA
Driller N. Harrington Log By J. Bishop Date 9/7/94 Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

* = Sample sent for TCL/TAL. ** = Sample sent for HSP Indicators. @ = Sample sent for geotechnicals.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0			30% 8-15-8-11		SP	0'-2': Top: Slightly moist, light brown, slightly, pliable, FINE SAND, trace silt, trace organic; Bottom: Dry, brown/red, loose, FINE SAND, little fine gravel, trace coarse sand, trace cobbles, all slag
2			20% 8-7-7-5			2'-4': Same as above (bottom), but black/red, cobbles in tip
4		8.3	55% 5-10-14-10			**4'-6': Same as above, but black at top
6		0	20% 10-7-10-25			6'-8': Same as above, no black, trace cobbles
8		2.5	15% 4-25-19-7			8'-10': Dry, tan, loose, FINE SAND, trace coarse sand (slag), trace fine gravel (slag)
10		20.2	2% 38-24-28-15			10'-12': Same as above, but trace cobble (one)
12		0.97	15% 10-8-8-8		Slag	**12'-14': Same as above, but black/brown, trace/little, coarse gravel/cobbles, brick
14		0	15% 5-5-15-20"			14'-16': Same as above, but no brick, red/brown
16		0	15% 5-17-21-24			**16'-18': Same as above, but moist/wet
18		0	30% 21-27-18-8			18'-20': Same as above
20		0	25% 19-11-10			20'-22': Wet, black, loose, COBBLES and COARSE SAND, little fine gravel, slag
22		0	30%			22'-24': Same as above, but COARSE SAND, some cobbles, little fine gravel, little fine/medium sand
24		0	40%		SC	

GROUNDWATER TECHNOLOGY

Drilling Log

Monitoring Well MW-13

Project NIMO - Troy Owner Niagara Mohawk

Location Water Street, Troy, New York Proj. No. 0110-0037

Depth (Ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0	40% 18-27-28-25		SC	@24'-26': Moist/wet, gray, pliable/stiff, FINE SAND, little/some clay, little silt, trace coarse sand/fine gravel
26		0	75% 29-25-24-18		SM	*26'-28': Dry/slightly moist, gray, very compact, FINE SAND, little silt, trace coarse sand, trace fine-medium gravel (rounded to angular, multi-colored); till-like
28		0	3% 87-100/3"		SC	28'-28.8': Wet, grey, slightly pliable, FINE SAND, little/some clay, little silt, trace fine rounded gravel
30		0.0	2% 100/1"			28.8'-28.9': Same as above, but trace small shale chips End of boring.
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

FLUOR DANIEL GTI

Drilling Log

Monitoring Well MW-15

Project NMPC TROY - AREA 4 Owner NIAGARA MOHAWK
Location TROY, NEW YORK Proj. No. 0110-0424
Surface Elev. 24.3 ft. Total Hole Depth 38.67 ft. Diameter 4.25 in.
Top of Casing 24.15 ft. Water Level Initial ~8 ft. Static NA ft.
Screen: Dia 2 in. Length 25 ft. Type/Size PVC/.010 in.
Casing: Dia 2 in. Length 5 ft. Type PVC
Fill Material #0 morie sand Rig/Core Mobile B-59
Drill Co. ADT Method HSA
Driller HARRINGTON Log By J. BISHOP Date 9/19/96 Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		0.1	7-7-6-10 15%		GC	0-2': Brown/Gray, moist, loose/slight pliable, FINE GRAVEL, little/some clay, little silt
2		0.1	10-6-6-7 70%		GC	2-4': Brown/Gray, wet, slight pliable, CLAY AND FINE GRAVEL, some silt trace coarse sand
4		0.1	5-6-6-7 80%		CL	4-6': Brown/Gray, wet slight pliable, CLAY AND SILT, little fine sand, little fine gravel
6		0	8-6-7-8 80%		CL	6-8': Gray, moist, stiff, CLAY AND SILT, little wood
8		1.4	6-6-5-4 80%		CL	8-10': Same as above, but wet, plastic, no wood
10		0.8	2-2-6-7 100%		CL	10-12': Gray, wet, stiff, CLAY, some silt
12		0.5	6-6-5-8 100%		CL	12-14': Same as above
14		0.5	3-3-4-6 100%		CL	14-16': Same as above
16		0.2	4-5-6-8 100%		CL	16-18': Same as above
18		0.2	2-2-4-3 100%		CL	18-20': Same as above
20		0.3	2-2-3-4 100%		CL	20-22': Same as above
22		0.1	4-6-6-7 100%		CL	22-24': Same as above
24					CL	

FLUOR DANIEL GTI

Drilling Log

Monitoring Well MW-15

Project NMPC TROY - AREA 4 Owner NIAGARA MOHAWK

Location TROY, NEW YORK Proj. No. 0110-0424

Depth (Ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						24-26': Same as above
26		0	3-5-5-7 100%		CL	26-28': Same as above
28		0	2-8-14-34 100%		CL	28-29': Same as above
30		NS	11-22-21-20 50%		GC	29-30': Gray, wet, CLAY AND FINE GRAVEL (chips), little silt, little fine sand
32		SUMP				Drilled to 31'8"
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

FLUOR DANIEL GTI

Drilling Log

Monitoring Well MW-16

Project NMPC TROY - AREA 4A Owner NIAGARA MOHAWK
Location TROY, NEW YORK Proj. No. 0110-0424
Surface Elev. ____ Total Hole Depth 28 ft. Diameter 8 in.
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia 2 in. Length 20 ft. Type/Size PVC/.010 in.
Casing: Dia 2 in. Length 7.5 ft. Type PVC
Fill Material Morie #1 Rig/Core Mobile B-61
Drill Co. ADT Method HSA
Driller V. Prue Log By J. Favreau Date 6/6/97 Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

Steel shoe-piece of split-spoon was recovered in the drill cuttings.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2		2	12-18-8-8 1'		GM	2-4': Dry, dark brown/gray, loose, FINE SAND, some medium to coarse sand, little gravel & slag.
4		1	3-3-2-2 0.25'		GM	4-6': Same as above, with little silt.
6		0	2-2-2-2 0.25'		GM	6-8': Damp, dark gray/brown, loose, FINE to MEDIUM SAND, little fine gravel.
8		0.2	2-2-3-2 0.75'		SW	8-10': Damp, dark brown, loose, FINE SAND, little medium sand, trace silt & gravel.
10		1	0.25'		SW	10-12': Same as above.
12		5	1.25'		SW	12-14': Same as above, moist-wet, dark brown,
14		-	0'			14-16': No sample (shoe-piece came off of spoon, see comments above).
16		3	1.25'		SW	16-18': Damp-moist, dark brown/gray/black, same as above.
18		2	1.25'		SW	18-20': Moist, dark brown, FINE to MEDIUM SAND, little coarse sand, trace gravel.
20		23	0.75'		GM	20-22': Wet, dark brown, FINE to COARSE SAND, little fine gravel & slag.
22		0	1.25'		GM	22-24': Saturated, brown, FINE to MEDIUM SAND & SILT (~2" at top of sample), then gray, fine gravel.
24					GM	

FLUOR DANIEL GTI

Drilling Log

Monitoring Well MW-16

Project NMPC TROY – AREA 4A Owner NIAGARA MOHAWK
Location TROY, NEW YORK Proj. No. 0110-0424

Depth (Ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
		1.5	0.5'		GN	24–26': Saturated to dry, FINE to COARSE SAND, gravel & slag to ~25.75', then very dense, gray silt with gravel.
26						26–28': Wet, dark brown, FINE to MEDIUM SAND & SILT; bottom 2" of sample was dry, very dense, gray silt with gravel (till).
		0.5	0.5'		SN	
28		0				28–28.5': Dry, gray, TILL, then gray, SHALE
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

APPENDIX C

GENERIC FIELD SAMPLING PLAN

Appendix C

GENERIC
FIELD SAMPLING PLAN

FOR

TROY – WATER STREET
AREA 4 – UPLAND SITE
TROY, NEW YORK

Prepared for:

National Grid
300 Erie Boulevard West
Syracuse, New York

Prepared by:

HydroQual Environmental Engineers & Scientists P.C.
1200 MacArthur Blvd.
Mahwah, New Jersey 07430

November 2005

ACKNOWLEDGEMENT

This generic field sampling plan was adapted from the plan entitled "Generic Field Sampling Plan for Site Investigations at Manufactured Gas Plants," prepared by Foster Wheeler Environmental Corporation, dated November 2002.

GENERIC
FIELD SAMPLING PLAN

TABLE OF CONTENTS

TABLES

FIGURES

1.0 INTRODUCTION

This generic Field Sampling Plan (GFSP) has been prepared for National Grid in accordance with the Record of Decision and Section 7.1 of the Remedial Design Report, dated October 2002, prepared by O'Brien & Gere Engineers, Inc. This document is intended to provide guidance for post-installation remedy monitoring, as described in the Record of Decision. The numbers and types of environmental samples to be collected are identified in the Operations, Maintenance and Monitoring Plan, to which this document is appended.

2.0 GENERAL FIELD GUIDELINES

2.1 Sample Identification

Each sample will be given a unique identification as shown in Table 1. With this type of identification, no two samples will have the same label. Labels or tags identified as shown in Table 1 will be attached to each sample container. Labels or tags will be rendered waterproof by either covering the label with clear plastic wrapping tape or utilizing waterproof material for the tag or label.

2.2 Sampling Equipment

The following is a general list of equipment, which may be utilized for sample collection:

- Appropriate sample containers (and coolers) provided by the laboratory;
- Sample bottles (kept closed and in the laboratory-shipped coolers until the samples are collected);
- Reagent-grade preservatives and pH paper or meter (or pre-preserved sample containers) for aqueous samples;
- Chain-of-Custody labels, tags, seals, and record forms;
- Logbook, field sampling records, and indelible ink markers;
- Laboratory grade decontamination detergents (such as Alconox, Liquinox, etc.), reagent-grade solvents, and deionized, organic-free water to be used for decontaminating equipment between sampling stations;
- Squirt Bottles;
- Ruler and measuring tape;
- Garbage bags;
- Paper towels and/or baby wipes;
- Buckets, wash basins, and scrub brushes to be used for decontaminating equipment;
- Digital camera or camera and film to document sampling procedures and sample locations;
- Stakes and flagging tape and/or spray paint to identify sampling locations;
- Shipping labels and forms;
- Knife;
- Vermiculite or other packing/shipping material for sample bottles;
- Strapping tape;
- Clear plastic tape;
- Duct tape;
- Aluminum Foil;
- Reclosable plastic bags;

- Ice;
- Portable field instruments, which may include a pH meter, conductivity meter, turbidity meter, dissolved oxygen (DO) meter or multi-parameter flow through cell, photoionization detector (PID), combustible gas indicator (CGI); and water level indicator;
- Poly-sheeting;
- Polypropylene or stainless steel bailers;
- Poly propylene rope and/or Teflon line; and
- Submersible, peristaltic and/or centrifugal pump and associated tubing.

Other sampling materials and equipment may be utilized as warranted by field conditions encountered at time of sampling and media to be sampled. Appropriate health and safety equipment and PPE, as per the NYSDEC appproved Health and Safety Plan will be used.

2.3 Field Records

The Project Manager will control field logbooks. Field logbooks will receive a serialized number. Field logbooks will be maintained by the field sampling crew while in the field to provide a daily record of significant events, observations, and measurements during field sampling activities. Entries will be signed and dated at the bottom of each page.

Information pertinent to field sampling activities will be recorded in the logbooks. The logbooks will be bound with consecutively numbered pages. Entries in the logbook will include the following information:

- Name and title of author, date and time of entry, and physical/environmental/weather conditions during field activity;
- Purpose of sampling activity;
- Location of sampling activity;
- Name and address of field contact;
- Name and title of field crew members;
- Name and title of Site visitors, if any;
- Sample medium (groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) collected;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);

- Field observations;
- Field measurements made, such as pH, temperature, turbidity, conductivity, water level, etc.;
- References for maps and photographs of the sampling site(s);
- Information pertaining to sample documentation such as:
    - Bottle lot numbers
    - Dates and method of sample shipments
    - Chain-of-Custody Record numbers
    - Overnight Shipping Air Bill Number

Original data recorded in Field Logbooks, Sample Tags, and Chain-of-Custody records will be written with waterproof ink. None of these accountable, serialized documents will be destroyed.

If an error is made on an accountable document assigned to one individual, that individual will make corrections simply by crossing a single line through the error, placing the initials of the individual making the correction and date next to the crossed out information and entering the correct information. The erroneous information will not be erased. Field personnel will be instructed as to the proper field logging techniques for maintaining the integrity of the documentation.

3.0 GROUNDWATER SAMPLING

The following is a step-by-step sampling procedure to be used to collect groundwater samples from the monitoring wells. Well sampling procedures will be recorded on the form shown in Figure 1. Sample management is detailed in the Generic QAPP, attached as Appendix D.

- Groundwater samples will not be collected until at minimum, one week following well development.
- Prior to sampling, measure the static water level from the surveyed well elevation mark on the top of the PVC or stainless steel casing with a decontaminated water level probe. The elevation of nearby surface water bodies will also be recorded using bulkheads, culverts, or other convenient structures as reference points in which the elevation is known. These relative measurements will be used to aid with interpreting the relationship between observed surface water and groundwater fluctuations. Record time, date, and measurement to nearest 0.01 foot and record in the field logbook.
- Decontaminate field test equipment and meter probes prior to use on-site. Prior to collecting a round of groundwater elevations, an oil/water interface probe will be used to determine the presence of LNAPL and DNAPL in the well.
- A round of groundwater elevations will be collected prior to the start of sample collection. The measurement at each well location will be made from the top of the PVC or stainless steel casing with a water level probe. The measurements will be made in as short a time frame as practical to minimize temporal fluctuations in hydraulic conditions.
- Place a plastic sheet on the ground to prevent contamination of the bailer rope and/or the tubing associated with the purging (pump) equipment.
- Purge the well by removing a minimum of 3 well volumes or at least one volume of saturated sand pack, whichever is greater or use the low flow sampling procedures below. Purging will be conducted with a teflon, stainless steel or disposable polyethylene bailer, or a centrifugal, submersible, peristaltic, or whale pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist, and with the prior approval of National Grid and NYSDEC. Purging of the well to stabilized parameters may be performed at between 100 to 500ml/min. If the well goes dry before the required volumes are removed, the well may be sampled when it recovers sufficiently.
- Collect BTEX samples [volatile organic analyte (VOA)] with Teflon, stainless steel or dedicated polyethylene bailers lowered by a dedicated polypropylene and/or Teflon line or other methods as indicated. PAHs (SVOCs), may be collected with Teflon, stainless steel, or dedicated polyethylene bailer or a submersible, or peristaltic pump using the low-flow sampling technique. Low flow well sampling will be at a rate less than or equal to 100ml/min.

Low-flow sampling procedures may be utilized to collect samples for metals analysis if sample turbidity is excessive. Low flow sampling will be performed according to USEPA (1998) guidance. The pump should be capable of throttling to a low flow rate suitable for sampling.

- Measure temperature, pH, turbidity, DO, and conductivity, at 5 to 10 minute intervals. When the parameters stabilize over 3 consecutive readings, sampling may commence. Record results in the field logbook prior to sample collection.
- Fill sample containers for BTEX (VOCs) first. Sample containers for PAHs (SVOCs) are then filled.
- After samples are collected, dispose of polypropylene line and bailer, or other dedicated disposable sampling equipment.

4.0 FIELD INSTRUMENTS

Field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. A calibration log will be created on which equipment calibration will be recorded. Further details on calibration, precision, accuracy, etc. are provided in the Generic QAPP. The calibration procedures will conform to manufacturer's standard instructions. Calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. If an equipment malfunction is identified during calibration then the malfunctioning equipment will be replaced within 24-hours or applicable fieldwork will be terminated as necessary until the malfunctioning equipment is repaired or replaced. Records of instrument calibration will be maintained by the Field Sampling Crew and will be subject to audit by the Project Quality Assurance Manager (PQAM). Copies of instrument manuals will be maintained on-site.

4.1 Portable Photoionization Detector

The photoionization detector (PID) will be equipped with a minimum 10.6 eV lamp. The PID should be capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the volatile organic compounds on the NYSDEC ASP Target Compound List. Calibration will be performed at the beginning and end of each day of use with a standard calibration gas specified by the manufacturer. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required. Calibration data will be recorded in field logbooks and on calibration log sheets to be maintained on-site.

A battery check will be completed at the beginning and end of each working day. If erratic readings are experienced, the battery will be checked for proper voltage. This information will also be recorded in field logbooks and on the calibration log sheets.

4.2 pH Meter

Calibration of the pH meter will be performed at the start of each day of use, and after very high or very low readings. National Institute of Standards and Technology - traceable standard buffer solutions, which bracket the expected pH range, will be used. The standards will most likely be pH of 7.0 and 10.0 standard units. The use of the pH calibration and slope knobs will be used to set the meter to display the value of the standard being checked. The pH meter readings during calibration must be within 0.1 of the reference solution. The calibration data will be recorded on calibration sheets maintained on-site.

4.3 Specific Conductivity Meter

Calibration checks using the conductivity standard will be performed at the start of each day of use, after five to ten readings or after very high or low readings. The portable conductivity meter will be calibrated on a daily basis using a reference solution specified by the manufacturer. Readings must be within 5 percent to be acceptable. The thermometer of the meter will be calibrated against the field laboratory thermometer on a weekly basis.

4.4 Turbidity Meter

Calibration using a turbidity standard will be performed at the start of each day of use and after very high or low readings. The portable turbidity meter will be calibrated using a reference solution specified by the manufacturer. The turbidity reading must be within ±2 NTU of the standard to be acceptable.

4.5 DO Meter

Calibration using a DO standard will be performed at the start of each day of use. The portable DO meter will be calibrated using a calibration solution specified by the manufacturer. The DO reading must be within 5% of the standard to be acceptable.

4.6 Combustible Gas Indicator

Calibration of the CGI will conform to the procedures prescribed in the NYSDEC approved Health and Safety Plan. Calibration will occur at the start of each day of use.

TABLES

Table 1
METHOD FOR IDENTIFYING AND LABELING SAMPLES

LLLL*	LL*	NN*	NN/NNNN*
Site	Sample Type	Sample Location	Time

Site : Troy – Area 4

Sample Type: Monitoring Well (MW), Surface Soil (SS), Subsurface Soil (SB), Sediment (SD), Surface Water (SW), Waste Water (WW), Solid Waste (WA)

Sample Number: Number referenced to a sample location map illustrated in the Site-Specific Work Plan.

* L = Letter
* N = Number

FIGURES

Figure 1

SAMPLE LOG SHEET

I. SAMPLE IDENTIFICATION

Project: _____ Project No.:
Client: _____ Project Manager: _____
Sample Name/Number: _____ Date: _____ Time: _____ Hrs
Sampling Location/Depth: _____ Type: _____ Grab _____ Composite
Sample Matrix: _____ Surface Water _____ Groundwater _____ Sediment
_____ Soil _____ Waste
_____ Other (Specify) _____

Sampled By: _____

II. SAMPLE SOURCE

_____ Well	_____ Outfall	_____ Leachate
_____ Drum	_____ Boring	_____ River/Stream
_____ Bldg/Structures	_____ Tank	_____ Impoundment
_____ Test Pit/Trench	_____ Other (Specify)	_____

Source Description _____

III. FIELD OBSERVATIONS/MEASUREMENTS

Appearance/Color: _____
Volatile Organic Analysis (VOA): _____ HNU _____ OVA _____ Other
VOA Readings: Off Sample _____ Respiratory Zone _____
LEL/O_2/H_2S Readings: LEL _____ O_2 _____ H_2S _____
Radioactivity (mR/hr): _____
pH: _____ Conductivity: _____ Temperature: _____
Salinity: _____ Other: _____
Observations: _____

IV. SAMPLE DISPOSITION

Preservation: _____
Laboratory Name: _____
Laboratory Location: _____ On-Site _____ Off-Site
Forwarded to Laboratory: Date: _____ Time: _____ Hrs
Laboratory Sample No.: _____
Chain of Custody No.: _____ Airbill No.: _____

V. ADDITIONAL REMARKS

APPENDIX D

GENERIC QUALITY ASSURANCE PROJECT PLAN

Appendix D

GENERIC
QUALITY ASSURANCE PROJECT PLAN

FOR

TROY – WATER STREET
AREA 4 – UPLAND AREA
TROY, NEW YORK

Prepared for:
National Grid
300 Erie Boulevard West
Syracuse, New York

Prepared By:

HydroQual Environmental Engineers & Scientists P.C.
1200 MacArthur Blvd.
Mahwah, NJ 07430

November 2005

ACKNOWLEDGEMENT

This generic quality assurance project plan was adapted from the plan entitled "Generic Quality Assurance Project Plan for Site Investigation at Non-owned Former MGP Sites," prepared by Foster Wheeler Environmental Corporation, dated November 2002.

TABLE OF CONTENTS
GENERIC QUALITY ASSURANCE PROJECT PLAN

LIST OF TABLES

LIST OF FIGURES

1.0 GENERAL

This Generic Quality Assurance Project Plan (QAPP) has been prepared to specify procedures that will provide data of known, documented quality, and which will be legally defensible, should the need exist. This document specifically supplements the Generic Field Sampling Plan (FSP), also attached as an appendix to the Operations, Maintenance and Monitoring Plan (OM&M Plan).

2.0 PROJECT ORGANIZATION

The project organization is described in detail in the OM&M Plan. The project organization describes the relationship between the National Grid (NG) Project Manager, NYSDEC Project Manager, NG's Engineering Consultant, and subcontractors.

For the purpose of quality control, the Engineering Consultant's Project Quality Assurance Manager (PQAM) will be responsible for review of data upon receipt from the analytical laboratory. The PQAM will assure that data screening is performed by trained and experienced personnel using the applicable criteria specified in the NYSDEC 2005 Analytical Services Protocol (ASP). For the purposes of this document, references to ASP indicate the 2005 NYSDEC Analytical Services Protocol. The specific requirements for data screening are given in Section 8.3. The PQAM will be responsible for ensuring that analytical data are in conformance with requirements of this QAPP.

3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

The overall quality assurance (QA) objective for the project is to develop and implement procedures which will provide data of known, documented quality. Field and laboratory quality assurance/quality control (QA/QC) requirements defined in the NYSDEC ASP and other applicable guidelines ensure acceptable levels of data quality will be maintained throughout the sampling and analysis program.

The QA/QC objectives for measurement data include precision, accuracy, representativeness, completeness, and comparability. The data reduction, validation, and reporting scheme is presented in Figure 1. The quality assurance samples to be collected (type and frequency of collection) are specified in Section 4.3.

3.1 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range are common. For this project, precision will be evaluated by recording duplicate measurements of the same parameter on similar sample aliquots under the same conditions and calculating the relative percent difference (RPD) between the values. The formula for calculating RPD is presented in Section 12.2.

RPDs can only be calculated when the duplicate samples both contain detectable concentrations of the analyte. If an analyte is considered not detected at the detection limit, then RPD cannot be calculated. Instead, the results of the analysis of the two-spiked laboratory samples will be used to determine precision.

Measurement data for this project will include field data as well as laboratory analytical data. Laboratory precision will be performed according to the requirements described in the associated analytical methods. The field measurement data may include pH, conductivity, temperature, turbidity, organic vapor readings, and water level measurements. The objective for precision of field data collection methods is to take replicate (minimum of two for every 20 samples) measurements for field parameters to determine the reproducibility of the measurements.

As the screening is not quantitative (i.e., the screening determines if the constituents are present above or below standard values and does not provide a numeric result), RPDs cannot be calculated on the field-analyzed samples. Therefore, measurement of equivalent levels of constituent (i.e., detected below the same standard or within the same range of two standards) will be considered as denoted precision of the screening test.

For the pH meter, precision will be tested by multiple readings in the medium of concern.

Consecutive readings should agree within 0.1 pH units after the instrument has been field calibrated with standard buffers before each use. The thermometer will be visually inspected prior to each use to ensure its condition is satisfactory. Consecutive measurements of a given sample should agree to within 1°Celsius. After calibration, the conductivity meter will be tested for precision at ± 1% of full-scale, depending on the meter/scale. The organic vapors will be measured using a Photovac Microtip (or equivalent) photoionization detector (PID). Daily background and upwind readings of drilling and sampling activities will be measured prior to commencing work and at periodic intervals throughout each day's activities. The natural variation/fluctuation in measurements at background or upwind locations will be used for baseline background values, and the variability will be noted. Water level indicator readings will be precise within 0.01 feet for duplicate measurements or additional water level measurements will be collected to determine whether the difference is due to operator or instrument error. Turbidity measurements will be calibrated to a precision of ± 2% nephelometric turbidity units (NTUs).

3.2 Accuracy

Accuracy is a measure of the difference between a measured value and the "true" or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material and is expressed as the percent of the known quantity, which is recovered, or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes that are close to the detection limits are less accurate because they are affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument or other variables and thus will be more accurate.

The accuracy of laboratory-measured data will be evaluated by determining the percent recovery of both matrix and blank spike samples as described in Section 12.1. For the measurement of organics by gas chromatography (GC) or GC/mass spectroscopy (MS), the recovery of a surrogate spiked into each sample, blank, and standard will also be used to assess accuracy.

The objective for accuracy of the other field measurements is to achieve and maintain factory equipment specifications for the field equipment. Field measurements cannot be assessed for accuracy by spiking the medium with the analytical parameter and measuring the increase in response; therefore, these instruments can only be assessed for accuracy by the response to a known sample (such as a calibration standard) used to standardize them. The pH meter, conductivity meter, and turbidity meter are calibrated with solutions traceable to the National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards).

All volatile organic detectors (such as the PID) will be calibrated to an appropriate standard daily prior to use.

3.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of the sampling program. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, or analysis. Decontamination of sampling devices will be performed between samples as outlined in the FSP. Laboratory sample containers will be thoroughly cleaned in accordance with procedures outlined in Section 4.2. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank/duplicate and chain-of-custody procedures are presented in Sections 4.3 and 5.1.

3.4 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid. The QC objective for completeness is generation of valid data for 100 percent of the analysis requested. Any data deficiencies and their impact on project goals will be evaluated during data validation and discussed in the Data Usability Summary Report (DUSR) (see Section 8.3.1).

3.5 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another. The comparability of data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Ensuring traceability of analytical standards and/or source materials to USEPA or NIST;
- Verifying calibrations with an independently prepared standard from a source other than that used for calibration;
- Using standard reporting units and reporting formats including the reporting of QC data;
- The screening of analytical results, including the use of data qualifiers in all cases where appropriate; and

- The requirement that validated flags be used any time an analytical result is used for any purpose whatsoever.

These steps will ensure future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4.0 SAMPLING PROCEDURES

4.1 Sampling Program

- The objective of the sampling program is to provide current data concerning the presence and nature and extent of contamination of groundwater.

4.2 Sampling Procedures and Handling

Sample Container Preparation

Sample containers will be properly washed and decontaminated by the factory or laboratory prior to use. Preservatives will be added to containers prior to shipment by the laboratory. The types of containers and preservation techniques are shown in Table 1. Records of the sources of bottles and preservatives will be kept by the analytical laboratory.

Methods of Sampling

Sampling procedures will be in accordance with the most recent NYSDEC or USEPA guidelines and/or regulations, as appropriate. Alternate techniques will be utilized when such guidelines and/or regulations are inappropriate or non-existent. Alternate techniques will be implemented only after consultation with NYSDEC, whenever possible.

Referenced sampling procedures are listed below. Procedures will be the latest in effect as of the date of this Generic QAPP.

- USEPA - 600-4-79-020, "Methods for Chemical Analysis of Water and Wastes"
- National Water Well Association - "Manual of Ground-water Sampling Procedures"
- USEPA - 600-4-83-040, "Characterization of Hazardous Waste Sites - a Methods Manual: Volume II. Available Sampling Methods"
- USEPA - OSWER - 9950.1 "RCRA Ground-water Monitoring Technical Enforcement Guidance Document"
- USEPA - 540/S-95/504, "Low-Flow (Minimal Drawdown) Ground Water Sampling Procedures"
- NYSDEC – "Technical and Administrative Guidance Memoranda" (TAGMs)

Sampling methods are explained in detail in the FSP.

4.3 Quality Assurance Samples

Field Quality Control Samples

To assess field sampling and decontamination performance, two types of "blanks" will be collected

and submitted to the laboratory for analyses. The blanks will include:

Trip Blank - A trip blank will be prepared by the laboratory, and will consist of 40-ml volatile organic analysis (VOA) vials containing distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for which analysis for Target Compound List (TCL) volatiles or benzene, toluene, ethylbenzene and total xylenes (BTEX) is planned. The trip blank will be analyzed for TCL volatile organic compounds or BTEX to assess any contamination introduced as a result of sampling and transport, handling and storage.

Equipment Blank - Equipment blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix as specified in the Site-SpecificWork Plan. Equipment blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory, which has passed through or over the sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to collecting a sample. The equipment blanks will be analyzed for the same parameters as the matrix being sampled.

In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike (MS)/matrix spike duplicates (MSD)/matrix duplicates (MD).

The duplicates will consist of:

Field Duplicate - To determine the reproducibility and homogeneity of samples, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise. The frequency of collection of these samples is one per 20 field samples as specified in the Site-SpecificWork Plans. The criteria for assessing coded field duplicates are given in Section 6.0.

Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate (MS/MSD/MD) - MS/MSD/MD samples (MSD for organics; MD for inorganics) will be collected at a frequency of one pair per 20 field samples per seven day sample delivery group (SDG). The reproducibility and homogeneity of the samples can be assessed by determining the RPD for both spike and non-spike compounds as described in Section 12.0. The MS, MSD, and MD samples should be Site-Specific, unless otherwise authorized by the Engineering Consultant's Project Manager and/or PQAM after consultation with NG and NYSDEC personnel whenever possible.

5.0 SAMPLE TRACKING AND CUSTODY

Sample chain-of-custody (COC) will be initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples will be minimized.

In-situ or on-site monitoring data will be controlled and entered in permanent logbooks. Personnel involved in the COC and transfer of samples will be trained on the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity will be provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 2. A sample will be considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with custody seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.1 Field Sample Custody

A COC record will accompany the sample from time of collection to receipt by the analytical laboratory. If samples are split and sent to different laboratories, COC records will be sent with each sample. Figure 3 is a typical example of a chain-of-custody record. The "remarks" column will be used to record specific considerations associated with sample acquisition such as: sample type, container type, sample preservation methods, and analyses to be performed. Two copies of this record will accompany the samples to the laboratory. The laboratory will maintain one file copy, and the completed original will be returned to the Engineering Consultant's Project Manager.

Individual sample containers, provided by the laboratory, will be used for shipping/couriering samples. The shipping containers are insulated, and ice will be used to maintain samples at approximately four degrees Celsius until samples are returned and in the custody of the laboratory. All sample bottles within each shipping container will be individually labeled and controlled.

Each sample shipping container will be assigned a unique identification number by the laboratory, and will be marked with indelible ink on the outside of the shipping container. This number will be recorded on the COC record. The field sampler will indicate each individual sample designation/location number in the space provided on the appropriate COC form for each sample collected. The shipping container will then be closed, and a seal provided by the laboratory affixed to

the latch. This seal must be broken to open the container. Tampering may be indicated if the seal is broken before receipt at the laboratory. The laboratory will contact the Engineering Consultant's Project Manager, and the associated samples will not be analyzed if tampering is apparent.

5.2 Laboratory Sample Custody

The engineering consultant will notify the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program will meet the following criteria:

- The laboratory will designate a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of any discrepancy in documentation, the laboratory will immediately contact the Engineering Consultant's Project Manager and/or PQAM as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. That assessment will be recorded as part of the incoming COC procedure.
- The samples will be stored in a secured area at a temperature of approximately four degrees Celsius until analyses are to commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking form will accompany the laboratory report and will become a permanent part of the project records.

5.3 Sample Tracking System

A sample tracking system will be implemented to monitor the status of sampling events and laboratory analysis of samples. Sample numbers, types, analytical parameters, sampling dates, and sample delivery group (SDG) designations for samples, and required due dates for receipt of analytical results will be entered into the system. The Engineering Consultant's Project Manager will use the tracking system to monitor the project sampling schedules and the status of analytical reports, and to implement any penalty clauses for late delivery per standard laboratory subcontracts when

necessary.

A description of the sample tracking system follows:

1. For each day that samples are collected, the Engineering Consultant or designee will complete a COC form (Figure 3) and a Daily Status and Monitoring Report (Figure 4) listing appropriate samples.
2. The Engineering Consultant or designee will retain the client copy of the COC, and forward the laboratory copy of the COC with the sample shipment.
3. The Engineering Consultant or designee will fax copies of the completed COC form and Daily Status and Monitoring Report to the Engineering Consultant's PM. The Engineering Consultant's PM or a designated employee will confirm sample shipment with the laboratory and resolve any sample transfer issues.
4. The status of analytical results will be tracked by the Engineering Consultant's PM or designee using the information provided on the completed COC form and Daily Status and Monitoring Report. The information shall be summarized in a computerized database, as warranted.

Upon receipt of the analytical results from the laboratory, the Engineering Consultant's PM or designee will review the data package for completeness and contract compliance. The Engineering Consultant's PM will then prepare a Data Usability Summary Report (DUSR).

The Engineering Consultant's Project Manager or a designated representative will maintain day-to-day contact with the laboratory concerning specific samples and analyses directly or by assignment.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 Field Instrumentation Calibration

The Engineering Consultant will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

Field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on instrument calibration and maintenance log sheets or in a designated field logbook. The calibration information (log sheet or logbook) shall be maintained at the site during the on-site investigation and, once the field work is completed, shall be placed in the Engineering Consultant's project files. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). Project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment, and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. Verification checks may also be performed at the request of NG or NYSDEC representatives. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check (i.e., not within specifications), the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Equipment found to be out of calibration shall be re-calibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment, to acquire replacement data for the measurement in question.

Instrument consistently found to be out of calibration shall be repaired or replaced within 24 hours or field work will be terminated until the malfunctioning equipment is repaired/replaced.

6.2 Laboratory Instrumentation Calibration

Personnel at the laboratory will be responsible for ensuring that analytical instrumentation are of the proper range, type and accuracy for the test being performed, and that the equipment are calibrated at their required frequencies, according to specific protocols/procedures.

Off-site laboratory equipment shall be calibrated using certified/nationally recognized standards and

according to the applicable methodologies and the laboratory Standard Operating Procedures (SOPs). In addition, these methods/procedures specify the appropriate operations to follow during calibration or when any instrument is found to be out of calibration.

7.0 ANALYTICAL PROCEDURES

Off-site laboratory samples will be analyzed according to the methods provided in Exhibit D of the NYSDEC ASP. QA/QC procedures given in Exhibit E and I of the ASP will be followed. Regardless of the method used, analytical and extraction holding times must meet the NYSDEC ASP requirements for that analytical group (i.e., volatile analyses, including BTEX, have a holding time of seven days, if unpreserved). Holding times will be calculated from verified time of sample receipt at the laboratory. For NYSDEC ASP, samples must be received at the laboratory within 48 hours of sample collection. The analytical laboratory chosen for the project will be certified, and must maintain certification, under the New York State Department of Health's Environmental Laboratory Approval Program for analyses of solid and hazardous waste. The breakdown of samples is detailed in the OM&M Plan. Laboratory analytical methods and quantitation limits are presented in Tables 2 and 3 of this Generic QAPP. The method detection limits (MDLs) for the analytes will be specified by the laboratory selected for the project based on its most recent MDL studies, and subject to approval by the NYSDEC.

8.0 DATA REDUCTION AND REPORTING

The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the ASP.

The data package provided by the laboratory will contain the items specified in the ASP, as appropriate to the analyses performed. Category B reporting will be used.

8.1 Chain-of-Custody Records

Completed copies of the COC records accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the report of analytical testing.

8.2 Data Handling

One complete copy and one additional copy of the analytical data summary report will be provided by the laboratory. One set of the analytical data will be forwarded directly to the Engineering Consultant by the laboratory. The Engineering Consultant's Project Manager will immediately arrange for filing of the complete package, after the QA/QC reviewer checks the package to ensure deliverables have been provided. The second data summary report will be used to generate summary tables. These tables will form the foundation of a working database for assessment of the site contamination condition.

The Engineering Consultant's Project Manager will maintain close contact with the QA/QC reviewer to ensure non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA/QC review has been completed, the Engineering Consultant's Project Manager may direct the team leaders or others to initiate and finalize the analytical data assessment.

8.3 Data Review

The data review process will consist of a systematic review of the analytical results and QC documentation, and will be performed in accordance with the guidelines identified in Section 8.3.1. On the basis of this review, the Engineering Consultant will make judgments and express concerns and comments on the quality and limitations of specific data, as well as on the validity of the overall data package. The data validator will prepare documentation of his or her review and conclusions in a Data Usability Summary Report (DUSR; see Section 8.3.1).

The data tabulations will be sorted by classes of constituents and by sample matrix. Each individual table will present the following information:

- Sample matrix, designations, and locations;
- Sample dates;
- Constituents for which positive results were obtained;
- Reported constituent concentrations in the field and/or trip blanks associated with the

samples;

- Constituent concentration units;
- Name and location of laboratory which performed the analyses;
- Data qualifiers provided by the laboratory; and
- Data qualifiers and comments provided by the data validator, if any.

8.3.1 Data Usability Summary Report (DUSR)

A Data Usability Summary Report (DUSR) will be prepared after reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with the analytical method protocols includes sample chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, the field sampling notes should also be reviewed and any quality control problems should be evaluated as to their effect on the usability of the sample data.

The DUSR will describe the samples and analysis parameters reviewed. Data deficiencies, analytical method protocol deviations and quality control problems will be described and their effect on the data will be discussed in the DUSR.

Resampling/reanalysis recommendations, if applicable, will be made. Data qualifications are documented for each sample analyte following the NYSDEC ASP guidelines.

This work will be performed by trained and experienced personnel. The Engineering Consultant preparing the DUSR must submit a resume to the NYSDEC Quality Assurance Unit documenting relevant experience in environmental sampling and analysis methods and data review and documentation of a Bachelors Degree in Natural Science or Engineering. The results of the data screening (i.e. missed holding times or data rejected due to blank contamination) will be incorporated into the data summary tables used in the final report. The DUSR identifies data gaps caused by non-compliant or rejected data, and will indicate what steps have been or will be taken to fill these gaps.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 Quality Assurance Batching

Each set of samples will be analyzed concurrently with calibration standards, method blanks, MS, MSD or MD, and QC check samples (if required by the protocol). The MS/MSD/MD samples will be designated by the field personnel. If no MS/MSD/MD samples have been designated, then the laboratory must contact the Project Quality Assurance Officer (PQAO) or Engineering Consultant's Project Manager for corrective action.

9.2 Organic Standards and Surrogates

Standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or earlier based upon data indicating deterioration.

9.3 Laboratory Quality Control Samples

The quality control samples included are detailed below.

Method Blanks/Preparation Blanks: Analyses for organic compounds (method blank) and inorganics (preparation blank) include a blank analysis of the laboratory reagent water. The blank is analyzed with each set of samples or more often as required to verify that contamination has not occurred during the analytical process. The concentration of target compounds in the blanks must be less than or equal to the method detection limits specified in the ASP for the selected method of analysis.

Matrix Spike/Matrix Spike Duplicate Analysis - This analysis is used to determine the effects of matrix interference on analytical results. Spikes of analytes are added to aliquots of sample matrix in the manner specified in the ASP. Selected samples are spiked to determine accuracy as a percentage recovery of the analyte from the sample matrix and precision as RPD between the MS and MSD samples. A matrix duplicate is prepared in the same manner as the matrix spike sample.

Analytical Duplicate Samples - Replicate samples are aliquots of a single sample that are split on arrival at the laboratory, or upon analysis. Significant differences between two replicates, split in a controlled laboratory environment, will result in flagging the affected analytical results.

Surrogate Spike Analyses - Surrogate spike analyses are used to determine the efficiency of recovery of organic analytes in the sample preparations and analyses. Calculated percentage recovery of the spike is used as a measure of the accuracy of the total analytical method.

Laboratory Control Sample/ (Spike Blank) - For each method which requires a laboratory control sample (LCS) or spike blank, a LCS spike blank will be prepared with each quality control batch and analyzed according to criteria specified in the ASP. These samples support an assessment of the ability of the analytical procedure to generate a correct result without matrix effects or interference affecting the analysis.

10.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

Quality assurance audits may be performed by the Project Quality Assurance Manager (PQAM) or personnel designated by the PQAM. The PQAM and his or her designees function as an independent body and report directly to Engineering Consultant's quality assurance management. The PQAM may plan, schedule, and approve system and performance audits based upon the Engineering Consultant's procedure customized to the project requirements. These audits may be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). At times, the PQAM may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits.

Formal audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by lead auditors after gathering and evaluating resultant data. Items, activities, and documents determined by lead auditors to be in noncompliance will be identified at exit interviews conducted with the involved management. Noncompliances will be logged, documented, and controlled through audit findings which are attached to and are a part of the integral audit report. These audit finding forms will then be directed to management to satisfactorily resolve the noncompliance in a specified and timely manner. Audit checklists, audit reports, audit findings, and acceptable resolutions must be approved by the PQAM prior to issue. QA verification of acceptable resolutions will be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the PQAM will close out the audit report and findings.

It is the Engineering Consultant's Project Manager's overall responsibility to verify that corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Engineering Consultant's Project Manager within 15 days of completion of the audit. Serious deficiencies must be reported to the Engineering Consultant's Project Manager within 24 hours.

Serious deficiencies identified during an audit will be reported to NG and NYSDEC as part of the DUSR.

10.1 System Audits

System audits, performed by the PQAM or designated auditors, may encompass evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Engineering Consultant's Project Manager requests the PQAM to

perform unscheduled audits, these activities will be instituted.

10.2 Performance Audits

In accordance with the requirements for NYSDOH ELAP CLP certification, the laboratory will participate in performance evaluation testing.

Also, one field audit may be performed by the PQAM or designated auditor during collection of the field samples to verify that field samplers are following established sampling procedures. Performance of a field audit will be based on the type of activitie being performed, and available information concerning prior inspections of the project or sampling team.

11.0 PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 Preventive Maintenance Procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators. Analytical instruments will be serviced at intervals recommended by the manufacturer. An instrument repair/maintenance log book will be kept for each instrument, and this log will be available on-site during field activities and, at the completion of the investigation, be placed in the project files. Entries include the date of service, type of problem encountered, corrective action taken, and initials and affiliation of the person providing the service.

The instrument use log book will be monitored by the analysts to detect any degradation of instrument performance. Changes in response factors or sensitivity are used as indications of potential problems. These are brought to the attention of the laboratory supervisor and preventive maintenance or service is scheduled to minimize down time. Back-up instrumentation and an inventory of critical spare parts are maintained to minimize delays in completion of analyses.

Use of equipment in need of repair will not be allowed, and field work will be terminated until the malfunction is repaired or the instrument replaced.

11.2 Schedules

Written procedures, where applicable, will identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools, gauges, etc. shall be performed by qualified personnel.

11.3 Records

Logs shall be established to record and control maintenance and service procedures and schedules. Maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories and by the data and sample control personnel when and if equipment, instruments, tools, and gauges are used at the sites. The Engineering Consultant's Project Manager or the PQAM may audit these records to verify complete adherence to these procedures.

11.4 Spare Parts

Where appropriate, a list of critical spare parts will be identified by the operator in consultation with the equipment manufacturer. These spare parts will be stored for availability and use in order to reduce the downtime. In lieu of maintaining an inventory of spare parts, a service contract for rapid instrument repair or backup instruments will be available.

12.0 ASSESSMENT PROCEDURES FOR DATA ACCEPTABILITY

Procedures used to assess data precision and accuracy will be in accordance with the appropriate laboratory method, and as periodically updated.

12.1 Accuracy

The percent recovery is calculated as below:

$$\% = \frac{Ss - So}{S} \times 100$$

So = The background value, i.e.; the value obtained by analyzing the sample

S = Concentration of the spike added to the sample

Ss = Value obtained by analyzing the sample with the spike added

% = Percent Recovery

12.2 Precision

The relative percent difference (RPD) is calculated as below:

$$RPD = \frac{|V1 - V2|}{0.5\,(V1 + V2)} \times 100$$

V1, V2 = The two values obtained by analyzing the duplicate samples

12.3 Completeness

Completeness is the measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained under ideal conditions. A target of 100 percent completeness, calculated for each analysis method, has been established as the overall project objective.

$$PC = \frac{NA}{NI} \times 100$$

where:

PC = Percent completeness
NA = Actual number of valid analytical results obtained
NI = Theoretical number of results obtainable under ideal conditions

13.0 CORRECTIVE ACTION

The following procedures have been established to assure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

When a significant condition adverse to quality is noted on-site, at the laboratory, or at a subcontractor location, the cause of the condition will be determined and corrective action taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the Engineering Consultant's Project Manager, and involved subcontractor management. Implementation of corrective action is verified by documented follow-up action. Project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated:

- When predetermined acceptance standards are not attained
- When procedure or data compiled are determined deficient
- When equipment or instrumentation is found faulty
- When samples and test results are questionably traceable
- When quality assurance requirements have been violated
- When designated approvals have been circumvented
- As a result of system and performance audits
- As a result of a management assessment
- As a result of laboratory/inter-field comparison studies
- As required by NM
- As required by NYSDEC ASP, 2001

Procedure Description

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities.

Work may be audited at Engineering Consultant's office, Site, laboratory, and subcontractor locations by the PQAM and/or designated auditor. Items, activities, or documents ascertained to be in noncompliance with quality assurance requirements will be documented and corrective actions mandated through audit finding sheets attached to the audit report. Audit findings are logged,

maintained, and controlled by the PQAM (Section 11.0).

Technicians assigned quality assurance functions will also control noncompliance corrective actions by having the responsibility of issuing and controlling the appropriate Corrective Action Request Form (Figure 5). Project personnel may identify a noncompliance; however, the technician is responsible for documenting, numbering, logging, and verifying the closeout action. It is the Engineering Consultant's Project Manager's responsibility to verify that recommended corrective actions are produced, accepted, and received in a timely manner.

The Corrective Action Request (CAR) identifies the adverse condition, reference document(s), and recommended corrective action(s) to be administered. The issued CAR is directed to the responsible manager in charge of the item or activity for action. The individual to whom the CAR is addressed returns the requested response promptly to the technician in charge, affixing his signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The technician maintains the log for status control of CARs and responses, confirms the adequacy of the intended corrective action, and verifies its implementation. The technician will issue and distribute CARs to specified personnel, including the originator, responsible project management involved with the condition, the Engineering Consultant's Project Manager, involved subcontractor, and the FOL, at a minimum. CARs are transmitted to the project file for the records.

14.0 QUALITY ASSURANCE REPORTS

Quality assurance reports to management may consist of the reports on audits, reports on correction of deficiencies found in audits and a final QA report on field sampling activities.

At the end of the project, the PQAM may submit a lessons learned report to the Engineering Consultant's Project Manager which will discuss the QA activities. That report may include discussions of any conditions adverse or potentially adverse to quality, such as responses to the findings of any field or laboratory audits; any field, laboratory, or sample conditions which necessitated a departure from the methods or procedures specified in this QAPP; field sampling errors; and any missed holding times or problems with laboratory QC acceptance criteria; and the associated corrective actions undertaken. This report shall not preclude immediate notification to project management of such problems when timely notice can reduce the loss or potential loss of quality, time, effort, or expense.

These reports, if prepared, shall be reviewed by the Engineering Consultant's Project Manager for completeness and the appropriateness of any corrective actions, and they shall be retained in the project files.

Laboratory and field QC data will be presented including a summary of QA activities and any problems and/or comments associated with the analytical and sampling effort. Any corrective actions taken in the field, results of any audits, and any modifications to laboratory protocols will be discussed.

TABLE 3

TARGET ANALYTES AND CONTRACT REQUIRED QUANTITATION (CRQ) LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP Volatile Organic Compounds (by 2001-1)		
Benzene	10	10
Ethylbenzene	10	10
Toluene	10	10
Total Xylenes	10	10
NYSDEC ASP - Semivolatile Organic Compounds (by 2001-2) Base/Neutral Extractables		
Acenaphthene	10	330
Acenaphthylene	10	330
Anthracene	10	330
Benzo(a)anthracene	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(g,h,i)perylene	10	330
Benzo(a)pyrene	10	330
Chrysene	10	330
Dibenz(a,h)anthracene	10	330
Fluoranthene	10	330
Fluorene	10	330
Indeno(1,2,3-cd)pyrene	10	330
2-methyl Naphthalene	10	330
Naphthalene	10	330
Phenanthrene	10	330
Pyrene	10	330

NOTES

1. Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.
2. If the information provided in this table differs from the most recent version of the ASP (2005), the ASP requirements will take precedence

TABLE 1

SAMPLE CONTAINERIZATION

Analysis	Bottle Type	Preservation[1]	Holding Time[2]
Aqueous Samples			
Volatile Organics (BTEX)	40 ml glass vial with Teflon-lined septa	Cool to 4°C	7 days
Semivolatile Organics (PAHs)	1000 ml amber glass	Cool to 4°C	5 days*

NOTES

1. All samples to be preserved in ice at 4°C during collection and transport.
2. Days from verified time of sample receipt (VTSR) by the laboratory.
3. Sized appropriately for the analytical method.

TABLE 2
LABORATORY ANALYSIS PROGRAM

Matrix	Parameter [1]	Analytical Method [2]
Water	BTEX	Method 8260B*
	PAHs	Method 8270C*

NOTES

1. Abbreviations: BTEX = Benzene, Toluene, Ethylbenzene, Xylene; PAHs = Polycyclic aromatic Hydrocarbons; CLP = Contract Laboratory Program.
2. NYSDEC Analytical Services Protocol, 2005, Category B deliverables.
   Analyses must meet NYSDEC ASP holding time specified for Methods in Exhibit I Part II.
3. If the information provided in this table differs from the most recent version of the ASP (2005), the ASP requirements will take precedence.

* BTEX and PAH analyses must meet NYSDEC ASP holding time specified for Methods 2001-1 and 2001-2, respectively.

TABLE 3

TARGET ANALYTES AND CONTRACT REQUIRED QUANTITATION (CRQ) LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP Volatile Organic Compounds (by 2001-1)		
Benzene	10	10
Ethylbenzene	10	10
Toluene	10	10
Total Xylenes	10	10
NYSDEC ASP - Semivolatile Organic Compounds (by 2001-2) Base/Neutral Extractables		
Acenaphthene	10	330
Acenaphthylene	10	330
Anthracene	10	330
Benzo(a)anthracene	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(g,h,i)perylene	10	330
Benzo(a)pyrene	10	330
Chrysene	10	330
Dibenz(a,h)anthracene	10	330
Fluoranthene	10	330
Fluorene	10	330
Indeno(1,2,3-cd)pyrene	10	330
2-methyl Naphthalene	10	330
Naphthalene	10	330
Phenanthrene	10	330
Pyrene	10	330

NOTES

1. Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.
2. If the information provided in this table differs from the most recent version of the ASP (2005), the ASP requirements will take precedence

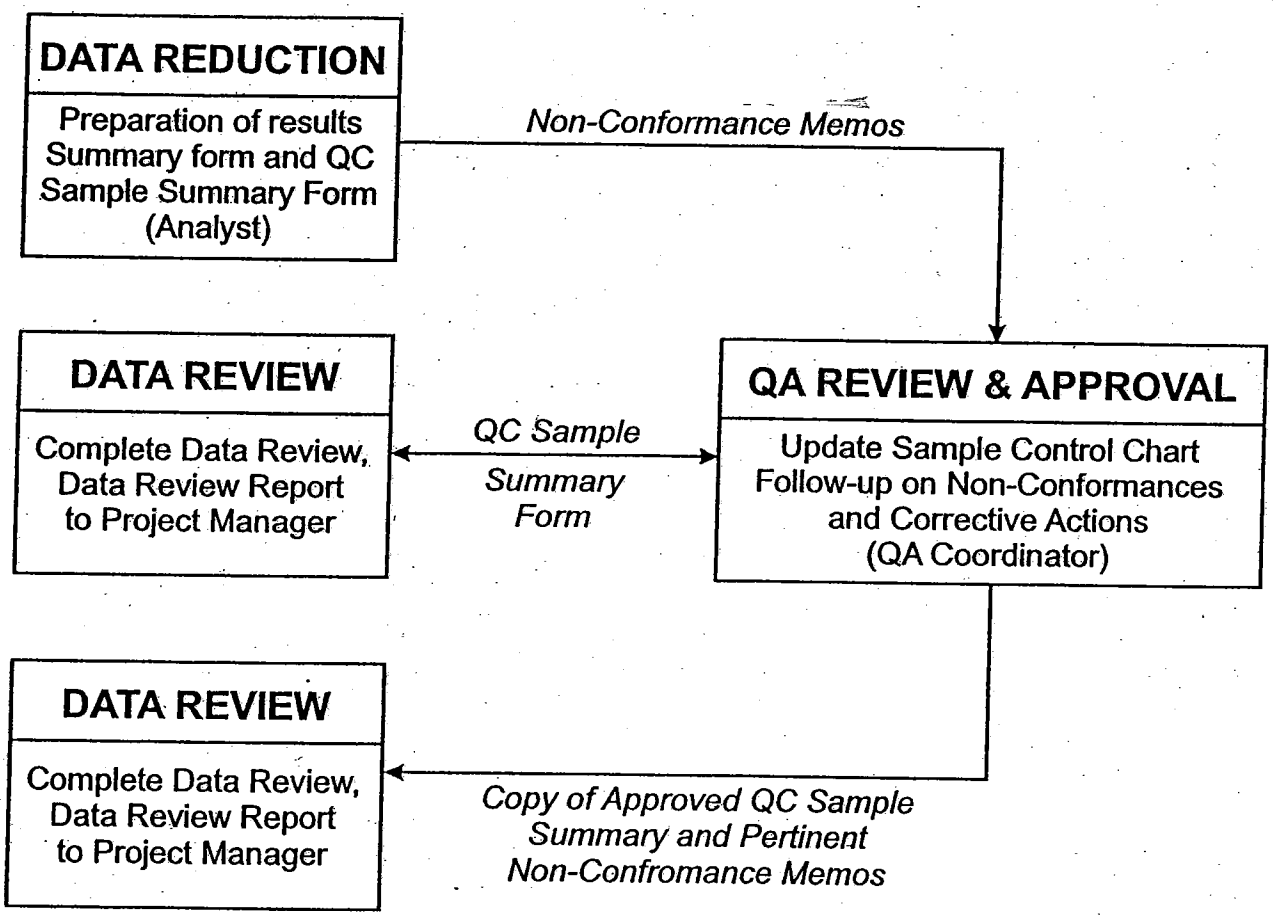
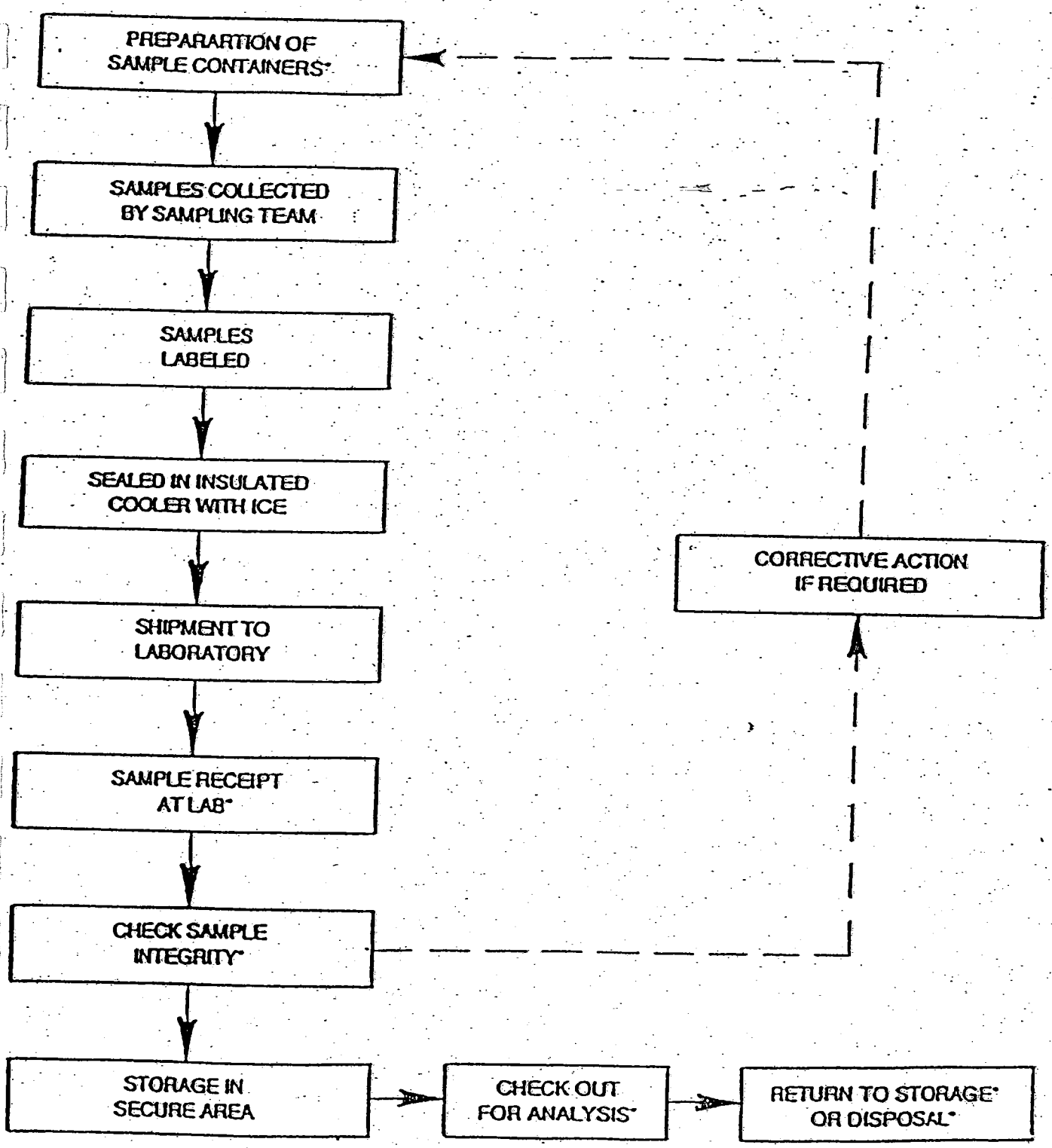


Figure 1

Data Reduction, Review & Reporting Scheme

Figure 2

SAMPLE CUSTODY



* Requires sign-off on Chain of Custody Form

Committed To *Your* Success

Tel: (203) [illegible]458
Fax: (203) 268-5346

STL JOB #:

CLIENT:

PROJECT ID:

STL PROJECT MGR:

RUSH ☐ YES ☐ NO DUE DATE

BOTTLE SET #	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX	GR	QC	BOTTLE TYPE AND PRESERVATION								SAMPLE REMARKS
						FIELD FILTERED / CIRCLE Y OR N								
						Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	

TO RE-ORDER CALL THE GRAPHIC DESIGN GROUP, INC. 516-243-1062

MATRIX CODES

A	- AIR	S	- SOIL
AQ	- AQUEOUS	SL	- SLUDGE
C	- COMPLEX	W	- WIPE
D	- DRUM WASTE	O	- OTHER
OI	- OIL	FB	- FIELD BLANK
		TB	- TRIP BLANK

BOTTLES PREPARED BY — DATE / TIME	BOTTLES REC'D BY — DATE / TIME
SIGNATURE	SIGNATURE
SAMPLES COLLECTED BY — DATE / TIME	RECEIVED IN LAB BY — DATE / TIME
SIGNATURE	SIGNATURE

REMARKS / SAMPLE RECEIPT

☐ BOTTLES INTACT ☐ CUSTODY SEALS

☐ PRESERVED ☐ SEALS INTACT

☐ CHILLED ☐ SEE REMARKS

LABORATORY COPY

Figure 4
Daily Status & Monitoring Report
National Grid SIR & MSA Programs

Date:_____ Site Name:_____

Project Manager:_____ Project Field Operations Lead:_____

Description of Field Work Performed:

Media	Sample Number	Types of Analyses	Sample Sent to Lab? (Y/N)	Comments

Means of Sample Shipment to Laboratory? Name and Location of Laboratory:

Issues/Concerns Raised:

Work to be Performed Tommorrow:

Name of Preparer:_____

Figure 5

CORRECTIVE ACTION REQUEST	CAR NO. _____ DATE _____
PROJECT NO./TITLE _____ _____ _____ TASK NO./TITLE _____ _____	REFERENCE(S) _____ _____ REPLY DUE DATE _____
SUBJECT _____ _____	PREPARED BY _____
DESCRIPTION OF CONDITION	APPROVED BY _____ PROJECT MANAGER
_____ _____ _____ _____ _____	
CAUSE AND CORRECTIVE ACTION (Include Effective Date) _____ _____ _____ _____ _____ _____ _____ _____	
TASK MANAGER DATE	PROJECT QA OFFICER DATE
PROJECT MANAGER DATE	
CLOSEOUT ACTION _____ _____ _____ _____ _____ _____ _____ _____	
PROJECT QA OFFICER DATE	PROJECT MANAGER DATE
SEE REVERSE SIDE FOR INSTRUCTIONS	

APPENDIX E

NYSDEC ANALYTICAL SERVICE PROTOCOL (ASP) METHODS AND CATEGORY B DELIVERABLES

NYSDEC Analytical Services Protocol Methods
Superfund Contract Laboratory Program Parameters

Pollutant of Interest	USEPA Method
Purgeable Organics (BTEX)	EPA SOW ILMO4.2
Semivolatile Organics (PAHs)	EPA SOW ILMO4.2
Low Concentration Purgeable Organics (BTEX)	EPA SOW OLCO2.1
Low Concentration Semivolatile Organics (PAHs)	EPA SOW OLCO2.1

APPENDIX F

NEW YORK STATE CLASS GA STANDARDS AND GUIDANCE VALUES

TABLE 3
(cf. section 703.6)
GROUNDWATER EFFLUENT LIMITATIONS
CLASS GA

Substance	CAS No.	Maximum Allowable Concentration (ug/L)
Alachlor	15972-60-8	0.5
Aldicarb and Methomyl	116-06-3; 16752-77-5	0.35
Aldrin	309-00-2	Not Detectable
Aluminum	Not Applicable	2,000
Antimony	Not Applicable	6
Arsenic	Not Applicable	50
Asbestos (fibers 10um)	Not Applicable	1.4 x 107 (fibers/L)
Atrazine	1912-24-9	7.5
Azinphosmethyl	86-50-0	4.4
Barium	Not Applicable	2,000
Benefin	1861-40-1	35
Benzene	71-43-2	1
Benzo(a)pyrene	50-32-8	Not Detectable
Bis(2-chloroethyl)ether	111-44-4	1.0
bis(2-ethylhexyl)phthalate	117-81-7	5
Bromacil	314-40-9	4.4
Butachlor	23184-66-9	3.5
Cadmium	Not Applicable	10
Captan	133-06-2	18
Carbaryl	63-25-2	29
Carbon tetrachloride	56-23-5	5
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans[7]	Not Applicable	7×10^{-7} equivalents of 2, 3, 7, 8 - TCDD
Chloramben[1]	Not Applicable	50
Chlordane	57-74-9	0.05
Chloride	Not Applicable	500,000
Chloroform	67-66-3	7
Chromium (Hexavalent)	Not Applicable	100
Copper	Not Applicable	1,000

Cyanide	Not Applicable	400
p,p'-DDD	72-54-8	0.3
p,p'-DDE	72-55-9	0.2
p,p'-DDT	50-29-3	0.2
Diazinon	333-41-5	0.7
1,2-Dibromo-3-chloropropane	96-12-8	0.04
Di-n-butylphthalate	84-74-2	50
Dicamba	1918-00-9	0.44
1,2-Dichlorobenzene	95-50-1	3
1,3-Dichlorobenzene	541-73-1	3
1,4-Dichlorobenzene	106-46-7	3
1,2-Dichloroethane	107-06-2	0.6
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	50
1,2-Dichloropropane	78-87-5	1
1,3-Dichloropropene (sum of cis- and trans-isomers)	542-75-6 (sum of 10061-01-5 and 10061-02-6)	0.4
Dieldrin	60-57-1	0.004
Di(2-ethylhexyl)adipate	103-23-1	20
N,N-Dimethylaniline	121-69-7	1
Diphenylhydrazine	122-66-7	Not Detectable
Diquat	2764-72-9	20
Endrin	72-20-8	Not Detectable
Ethylene dibromide	106-93-4	6 x 10-4
Ethylenethiourea	96-45-7	Not Detectable
Ferbam	14484-64-1	4.2
Fluoride	Not Applicable	3,000
Foaming agents[2]	Not Applicable	1,000
Folpet	133-07-3	50
Heptachlor	76-44-8	0.04
Heptachlor epoxide	1024-57-3	0.03
Hexachlorobenzene	118-74-1	0.04
Hexachlorobutadiene	87-68-3	0.5
alpha-Hexachlorocyclohexane	319-84-6	0.01
beta-Hexachlorocyclohexane	319-85-7	0.04

delta-Hexachlorocyclohexane	319-86-8	0.04
epsilon-Hexachlorocyclohexane	6108-10-7	0.04
gamma-Hexachlorocyclohexane	58-89-9	0.05
Hexachlorophene	70-30-4	See Note 3
Iron[4]	Not Applicable	600
Kepone	143-50-0	Not Detectable
Lead	Not Applicable	50
Malathion	121-75-5	7.0
Mancozeb	8018-01-7	1.8
Maneb	12427-38-2	1.8
Manganese[4]	Not Applicable	600
Mercury	Not Applicable	1.4
Methoxychlor	72-43-5	35
2-Methyl-4-chlorophenoxyacetic acid	94-74-6	0.44
Methylene chloride (Dichloromethane)	75-09-2	5
Methyl methacrylate	80-62-6	50
Mirex	2385-85-5	0.03
Nabam	142-59-6	1.8
Nickel	Not Applicable	200
Nitralin	4726-14-1	35
Nitrate (expressed as N)	Not Applicable	20,000
Nitrate and Nitrite (expressed as N)	Not Applicable	20,000
Nitrilotriacetic acid[5]	Not Applicable	3
Nitrite (expressed as N)	Not Applicable	2,000
Nitrobenzene	98-95-3	0.4
Octachlorostyrene	29082-74-4	0.2
Oil and Grease	Not Applicable	15,000
Paraquat	4685-14-7	3.0
Parathion and Methyl parathion	56-38-2; 298-00-0	1.5
Pentachloronitrobenzene	82-68-8	Not Detectable
pH	Not Applicable	See Note 6
Phenolic compounds (total	Not Applicable	2

phenols)		
Phorate and Disulfoton	298-02-2; 298-04-4	Not Detectable
Polychlorinated biphenyls	Not Applicable	0.09
Propachlor	1918-16-7	35
Propanil	709-98-8	7.0
Propazine	139-40-1	16
Selenium	Not Applicable	20
Silver	Not Applicable	100
Simazine	122-34-9	0.5
Styrene	100-42-5	930
Sulfate	Not Applicable	500,000
Sulfide	Not Applicable	1,000
Thiram	137-26-8	1.8
Toxaphene	8001-35-2	0.06
1,1,2-Trichloroethane	79-00-5	1
Trichloroethene	79-01-6	5
2,4,5-Trichlorophenoxyacetic acid	93-76-5	35
2,4,5-Trichlorophenoxypropionic acid	93-72-1	0.26
1,2,3-Trichloropropane	96-18-4	0.04
Trifluralin	1582-09-8	35
Vinyl chloride	75-01-4	2
Zinc	Not Applicable	5,000
Zineb	12112-67-7	1.8
Ziram	137-30-4	4.2

1. Includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.

2. Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.

3. Refer to groundwater effluent limitation for "Phenolic compounds (total phenols)".

4. Combined concentration of iron and manganese shall not exceed 1000 ug/L.

5. Includes related forms that convert to nitrilotriacetic acid upon

acidification to a pH of 2.3 or less.

6. pH shall not be lower than 6.5 or the pH of the natural groundwater, whichever is lower, nor shall be greater than 8.5 or the pH of the natural groundwater, whichever is greater.

7. Value is for the total of the chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans as equivalents of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) as specified by the Class GA H(WS) standard in Table 1 of section 703.5 of this Part.

In addition to the effluent limitations above, the following also apply in the counties of Nassau and Suffolk:

SUBSTANCE	MAXIMUM ALLOWABLE CONCENTRATION IN mg/L
(1) Dissolved solids, total	1,000
(2) Nitrogen, total (as N)	10

APPENDIX G

SOIL HANDLING PROTOCOLS FOR THE UTILITY CORRIDOR ADJACENT TO THE TROY-WATER STREET, AREA 4 SITE

Table of Contents

Acknowledgment:

Soil handling plan provided by National Grid, prepared by Blasland, Bouck & Lee, Inc., edited by HydroQual Environmental Engineers and Scientists, P.C. for use at the Troy, Water Street, Area 4 Site.

1. Introduction

This Soil Handling Protocol report has been prepared to maintain the safety of the public, workers, and the environment in the event that utility excavation activities are conducted by the City of Troy, North Greenbush, utility companies, subcontractors, and/or owners within Water Street ("Utility Corridor") adjacent to the Troy (Water Street – Area 4) site located in Troy, New York. This report has been organized into the following sections:

Section	Description
1 – Introduction	This section briefly describes the purpose of this report, provides a description of the utility corridor location, constituents of concern, and provides a classification of excavation activities.
2 – General Precautions	This section identifies precautions for excavation activities required within the utility corridor/Water Street.
3 – Contacts	This section presents the list of contacts for excavation activities within the utility corridor.

1.1 Utility Corridor Description and Location

The utility corridor is located along the eastern limit of Area 4 to the CSX right-of-way (including Water Street) as shown on site plan contained in Appendix A of the OM&M Plan. There are three utility lines that lie within the utility corridor, as follows:

- Gas Line – 4-inch diameter, high-density polyethylene, butt-fusion joints, reported 200 psi operating pressure

- Water Line – 8-inch diameter, ductile iron, bell and spigot joints, reported 250 psi operating pressure
- Sanitary Sewer Line – 42-inch composite concrete pipe, bell and spigot joints, 42-million gallons per day, reported 12-15 psi operating pressure.

Tar-impacted soils were observed within the utility corridor during site activities. The constituents of concern (constituents generally associated with manufactured gas plant sites) include benzene, toluene, ethylbenzene, xylene (BTEX), and polycyclic aromatic hydrocarbons (PAHs). The majority of tar-impacted soils were removed from the utility corridor during remedial construction activities at the Area 4 site. Excavation activities immediately adjacent to (e.g., within 5 feet) and beneath the utility pipes were considered impractical based on the substantial risk to site workers and the public should the integrity of the pressurized pipe(s) or joints be breached. In areas of the utility corridor where tar-impacted soil removal was not practical due to constraints imposed by subsurface utilities, a 40-mil linear low density polyethylene (LLDPE) membrane cover was installed. The LLDPE cover is installed between two 16-oz geotextiles to protect the membrane. The geosynthetics are covered with select fill. The asphalt (i.e., within Water Street) was replaced following tar-impacted soil removal activities. The geomembrane extends a minimum of 5-feet beyond the visually identified tar-impacted soil locations. The location of the geomembrane is shown on the site plan contained in Appendix A of the OM&M Plan.

1.2 Constituents of Concern

As referenced above and in the ROD for the site, the constituents of concern associated with the site soils include BTEX compounds, and PAHs. Current pathways for human exposure which may exist at the site (i.e., during intrusive activities) include 1.) ingestion and dermal contact and, 2.) inhalation of volatile vapors and fugitive dust. Intrusive activities/excavation activities classifications are described in the following section of this plan.

1.3 Classification of Excavation Activities

In the event of an emergency, a service disruption, or mandatory utility repair, connection, or upgrade, excavation activities within the utility corridor may be required. Potential excavation activities that may be conducted within the utility corridor have been divided into the following categories:

- **Emergency Excavation** – Immediate excavation activities are required to protect human health, the environment, or property due to a sanitary sewer or water pipe break, and/or a gas leak within the utility corridor.

- **Urgent Excavation** – Excavation is not deemed an emergency excavation; however, excavation activities must be conducted within 5 days. Work may require National Grid (in coordination with the facility conducting the excavation activities) to prepare a job-specific Work Plan to be submitted and approved by the New York State Department of Environmental Conservation (NYSDEC).

- **Routine Excavation** – Excavation is not deemed an emergency excavation or an urgent excavation and can wait 30 days (or more) prior to implementation. Activities that may fall under this include, but may not be limited to, planned maintenance, installation of services, pipe modifications, etc.

2. General Precautions

This section identifies the general precautions to be considered for excavation activities to be conducted within the utility corridor. The applicability and extent of each precaution (presented below) will be determined based upon the classification of the excavation activity (i.e., emergency, urgent, or routine) and the nature of the excavation activity (e.g., scope, depth, and location).

Notification

National Grid shall be notified prior to conducting urgent or routine excavation activities (utilizing the contact list presented in Section 3) within the utility corridor. National Grid personnel will notify the NYSDEC to report the intrusive work. In addition, other utilities (one-call/dig safe) should be contacted in order to determine or locate underground facilities in the vicinity of the excavation area. National Grid shall be notified as soon as practicable (i.e., within 1 business day) in the event of an emergency excavation once the emergency is under adequate control. Notifications can be made verbally initially, but will be followed by written notifications (e.g., electronic mail or letter).

Health and Safety Plan (HASP)

Contractors conducting excavation activities within the utility corridor are required to perform the work activities in conformance with a site-specific CIH-certified HASP and are solely responsible for the health and safety of their workers and/or subcontractors. The site-specific HASP shall be prepared in accordance with the applicable rules and regulations included in 29 CFR 1910 and 29 CFR 1926. The HASP can include a corporate/company-established HASP identifying company health and safety practices and procedures;

however, the HASP must also include a description of site-specific hazards and protective measures (including personal protective equipment) associated with the work activities to be conducted within the utility corridor.

Occupational Safety and Health Administration (OSHA) 40-Hour Training

Due to the potential to encounter impacted material, workers are required to have or obtain OSHA 40-hour Hazardous Waste Operations (HAZWOPER) training and the corresponding 8-hour refresher.

Air Monitoring

Air monitoring is required for both worker and community protection. Air monitoring should include monitoring for volatile organic vapors and dust/particulate matter. Air monitoring shall be conducted in conformance with the site-specific HASP and shall incorporate community air monitoring to be conducted in conformance with the New York State Department of Health Generic Community Air Monitoring Plan.

Soil Handling

Impacted soil (i.e., soils that exhibit tar, appear oil saturated, discolored, stained or exhibit elevated volatile organic vapors) must be placed in a container for characterization and disposal by National Grid. Acceptable containers for the storage of impacted soil are New York State Department of Transportation- (NYSDOT-) approved 55-gallon drums, roll-offs, or dump truck beds. With the exception of 55-gallon drums, containers shall be lined with polyethylene sheeting prior to placement of soil. In addition, each container shall be covered with a lid (55-gallon drum) or canvas cover that is secured. During emergency excavations, the excavation materials may be temporarily stored on and covered by plastic sheeting until acceptable containers can be delivered to the site.

National Grid shall be contacted to identify the appropriate soil handling and staging protocol and to coordinate soil characterization, manifesting, and disposal. No material from within the utility corridor shall be removed from the site without written approval from National Grid.

Excavation Dewatering

Water, if any, generated during excavation activities within the utility corridor shall be containerized by those conducting the work activities for subsequent characterization and disposal by National Grid. Acceptable containers for water storage would be NYSDOT-approved 55-gallon drums, high density polyethylene tanks, frac tanks, or approved equal. During emergency excavation, the water may be temporarily pumped into any water tight container and then transferred into acceptable containers for disposal.

Dust Control

Dust control shall be provided during the soil excavation activities to mitigate the migration of dust outside of the utility corridor work area. Dust control shall incorporate wetting work areas and haul roads or use of appropriate controls as necessary.

Equipment and Personnel Decontamination

Equipment used within the excavation area shall be decontaminated in a decontamination pad prior to leaving the work area. The decontamination pad shall be constructed to contain and collect the rinsate from the decontamination activities. Decontamination shall incorporate a wash (using scrub brushes as necessary) and rinse with potable water and collection of decontamination rinsate (placed in a 55-gallon drum for characterization and disposal by National Grid).

Personnel decontamination shall include the removal of soil from boots and clothing and the removal and disposal of used tyvek and work gloves prior to leaving the work area. If used, workers shall decontaminate overboots using the procedures for equipment decontamination.

3. Contacts

The following are the contacts to be notified in the event that work activities within the utility corridor are required. National Grid personnel are to be notified first and the caller will be directed to the appropriate additional contacts to notify (if necessary).

National Grid		
Brian Stearns, P.E. Project Manager	(315) 428-5731 brian.stearns@us.ngrid.com	300 Erie Boulevard West Syracuse, New York 13202
Terry Young, P.E. Environmental Affairs	(315)428-6614 terry.young@us.ngrid.com	300 Erie Boulevard West Syracuse, New York 13202
Barbara Scheurer Divisional Environmental Engineer	(518) 433-3696	1125 Broadway Albany, New York 12204
New York State Department of Environmental Conservation		
Lech Dolata Project Manager	(518) 402-9813 lxdolata@gw.dec.state.ny.us	NYSDEC 12th Floor 625 Broadway Albany, New York 12233

APPENDIX H

HEALTH AND SAFETY PLAN SPECIFICATION

SECTION 01340

HEALTH AND SAFETY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Health and Safety Plan

B. Personnel Requirements

C. Task/Operation Safety and Health Risk Analysis

D. Personnel Training Requirements

E. Personal Protective Equipment

F. Medical Surveillance Requirements

G. Air Monitoring and Personnel Air Sampling

H. Site Control Measures

I. Decontamination Plan

J. Emergency Response/Contingency Plan

K. Spill Containment Program

L. Additional Requirements

1. To be used by the CONTRACTOR as a reference in the preparation of the site-specific HASP.

2. The objective of these procedures is to minimize the risk of exposure to hazardous substances by identifying, evaluating and controlling potential safety and health hazards. CONTRACTOR shall be responsible for preparing and implementing the HASP. This HASP shall apply to all personnel on site during construction, including but not limited to, CONTRACTOR's employees and subcontractor's employees.

1.02 REFERENCES AND STANDARDS

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, specifications, and guidance, as applicable, except where more stringent requirements have been specified herein:

a. 85-115 – Occumpational Safety and Health Guidance Manual for Hazardous Waste Site Activities.

2. Code of Federal Regulations (CFR)

a. 29 CFR 1910 and 1926 – OSHA Safety and Health Standards, and citations adopted by reference.

b. 49 CFR Parts 171-178 – Department of Transportation (DOT) Hazardous Materials Regulations.

3. United States Environmental Protection Agency (USEPA)

a. Standard Operating Safety Guides

4. American Conference of Governmental Industrial Hygienists (ACGIH)

a. ACGIH Threshold Limit Values and Biological Exposure Indices

5. New York State Department of Health (NYSDOH) Generic Community Air Monitoring Requirements.

6. New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum #4031 (TAGM) – Fugitive Dust Supression and Particulate Monitoring at Inactive Hazardous Waste Sites.

1.03 PLAN DESCRIPTION

A. CONTRACTOR shall provide a site-specific Health and Safety Plan (HASP) which establishes policies and procedures to protect workers and the public from the potential hazards posed by the work. The HASP must be developed before site activities proceed.

1. At a minimum the plan shall:

a. Name key personnel and alternates responsible for site safety.
b. Describe risks associated with each operation conducted.
c. Confirm that personnel are adequately trained to perform their job responsibilities and to handle the specific hazardous situations they may encounter.
d. Describe the protective clothing and equipment to be worn by personnel during various site operations.
e. Describe any site-specific medical surveillance requirements.
f. Describe the program for periodic air monitoring, personnel monitoring, and environmental sampling (if needed).
g. Describe the actions to be taken to mitigate existing hazards to make the work environment less hazardous.

h. Define site control measures and include a site map.
i. Establish decontamination procedures for personnel and equipment.
j. Set forth the site's Standard Operating Procedures for Health and Safety.

B. Definitions

As used in the HASP, the following terms are defined:

Active Operations - Activities resulting in disturbance of soil, buildings, or equipment at a work area, which are considered intrusive activities.

Authorized Personnel - Any person, such as task-specific personnel, project personnel, oversight personnel, contractors, and consultants whose presence is authorized at the Project Site by OWNER.

Contamination Reduction Zone (CRZ) - The area that borders the Exclusion Zone before entering the Support Zone. This is the area where decontamination takes place.

Contractor/Subcontractor - Any person or firm, retained or hired by CONTRACTOR, to carry out and/or supervise any portion of the activities conducted at the Project Site.

Exclusion Zone - The area in which all personnel entering must be directly involved in the ongoing work, have designated personal protective equipment (PPE), and meet training and medical monitoring requirements. The exclusion zone will be defined by an approximate 25 feet radius around the work area or an appropriate physical barrier, which will be suitably marked.

MSDS - Material Safety Data Sheets, which provide information on the physical, chemical, and hazardous properties of chemical compounds.

Oversight Personnel - Any person, designated by the State, Federal Government, or Owner who is assigned to carry out oversight work.

PPM - Parts per million; expressed as PPM(v) for gases and vapors.

Project Personnel - Any person or contractor, assigned by OWNER, its consultants, its contractors or subcontractors, to carry out work at the Project Site (e.g., Project Director, Project Manager, etc.).

Project Health and Safety Officer - The designated person responsible for overall implementation of the Health and Safety Plan.

Project Site - The area defined by a specific project Work Plan, as well as contiguous areas to which access is required for the execution of the field tasks which may be set forth in a Work Plan.

Site Safety Officer - The person(s) designated by CONTRACTOR who is responsible for supervising the Health and Safety Plan.

Support Zone - The area outside the exclusion zone that is considered clean for the purpose of the Health and Safety Plan. It is used for transfer of equipment and materials (i.e., support) into the secure area.

Task-Specific Site Personnel - Any person or subcontractor assigned by CONTRACTOR to carry out work at the Project site.

1.04 SUBMITTALS

A. Submit HASP as described herein

B. A mimimum of 7 days prior to start of any intrusive work:

1. Written HASP containing all requirements under 29 CFR 1910.120. The plan shall be written to avoid misinterpretation, ambiguity, and mistakes that verbal orders cause.
2. HASP approvals by appropriate and qualified CONTRACTOR personnel for review by Owner, Owners' Representative, and by regulatory agencies.
3. Documentation of medical monitoring.
4. Documentation of personnel training.
5. Documentation of personnel respirator qualification and fit testing.

C. During Construction Activities:

1. All required forms and OSHA records will be kept on site as applicable.

1.05 PRODUCT

A. CONTRACTOR shall provide a HASP consistent with the recommended format as outlined in reference No. B25, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Minimum HASP requirements are described according to the following sample outline:

i. Table of Contents
ii. Tables and Figures
iii. Addenda

1.0 INTRODUCTION

1.1 Scope and Applicability of the HASP

A. Identify, evaluate, and control potential safety and health hazards.

B. Provide emergency response provisions for accidents during work operations.

1.2 Definition

A. To avoid misunderstanding on site, list the following items:
   1. List of terms referenced in HASP.
   2. List of term definitions.

1.3 Visitor Requirements on Site

A. Visitors may periodically visit the site. The visitors must:
   1. Be able to identify the secure zone and understand procedures.
   2. Know and follow sign in/sign out procedures.
   3. Show documentation of appropriate training and medical monitoring which is required in secure work zones.

2.0 KEY PERSONNEL/IDENTIFICATION OF HEALTH SAFETY PERSONNEL

A. Identify key personnel (and alternates) and organizational responsibilities for site safety. Also identify key personnel assigned to various operations. List telephone numbers, addresses and organizations of these people.

2.1 Key Personnel

A. List and define key project personnel on site and off site. Include names, title and office phone number.

2.2 Site Specific Health and Safety Personnel

A. List site health and safety personnel and alternates. Include name, title, and office phone number.

2.3 Organization Responsibilities

A. Specify minimum responsibilities of key project, and health and safety personnel.

3.0 TASK/OPERATION SAFETY HEALTH RISK ANALYSIS

3.1 Historical Overview of Site

A. Include a site history.

B. Include a site map to provide an understanding of the geographical area.

3.2 Task/Risk Analysis

A. Identify and evaluate any potential physical, biological, radiological or chemical hazards. Express potential impact on workers or the public.

B. Instructions

1. Identify chemical hazards including:

   a. respirable dust/vapors
   b. skin contact/absorption hazards
   c. accidental ingestion

2. Identify electrical hazards including:

   a. overhead electrical lines
   b. buried electrical lines
   c. de-energize electrical lines as required

3. Identify mechanical hazards including:

   a. moving equipment and vehicles
   b. rotating machine parts
   c. lockout/tagout moving machinery, as required

4. Identify fire/explosion hazards including:

   a. gasoline powered equipment
   b. smoking
   c. flammable fumes and vapors
   d. combustible gas from landfill

5. Identify heat and cold stress hazards including:

   a. extremely hot, humid weather
   b. extremely cold, windy weather

6. Identify acoustical hazards including:

   a. noisy equipment/machinery

7. Identify physical hazards including:

   a. slippery or uneven walking surfaces
   b. tripping hazards

8. Identify construction hazards:

a. confined space
b. trenching/shoring

9. Identify unanticipated hazards.

4.0 PERSONNEL TRAINING REQUIREMENTS

4.1 Training and Briefing Topics

A. Pre-project briefing meeting covering the following HASP topics:

- site characterization
- hazards
- medical surveillance requirements
- symptoms of overexposure to hazards
- site control
- training requirements
- monitoring equipment

B. Have all site workers sign an acknowledgment form attesting to attendance at the pre-project meeting, understanding of safety rules and documentation and understanding of respirator fit test.

C. Daily safety meeting to be held by the designated site safety officer to discuss specific current safety issues and as a daily safety reminder.

1. Suggested topics to be covered:

a. personal protective equipment
b. hazards
c. any injuries or close calls
d. weather related issues

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED

A. Define levels of protection required for work activities in terms of work location and/or work function. Define specific types of respirators and protective clothing for each level.

5.1 to 5.5 Level A, B, C and D Personal Protective Equipment

A. After review of hazards and the greatest expected exposure, select levels A-D personal protective equipment. Describe levels of protection worn by personnel and delineate specific job functions.

5.1 Level A - worn when the highest level of respiratory, skin, and eye protection is needed.

5.2 Level B - worn when the highest level of respiratory protection is needed, but a lesser level of skin protection.

5.3 Level C - worn when the criteria for using air-purifying respirators are met based on toxins and/or air monitoring results.

5.4 Level D - worn only as work uniform and not on any site with respiratory or skin hazards. (Note: Modified Level D is sometimes worn and includes wearing a Tyvek coverall.)

5.5 The level of protection is selected based on:

- Type and measured concentration of the chemical substances in the ambient atmosphere and their toxicity.
- Potential for exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done.

5.6 Reassessment of Protection Program

A. Levels of protection shall be upgraded or downgraded based upon changes in site conditions or later findings.

5.7 Work Mission Duration

A. The anticipated duration of the work mission is established.

B. Conditions that affect work mission duration to be addressed in this section are:

- cold and heat
- capacity to work in full face respirators
- air supply consumption of SCBAs

5.8 Chemical Resistance and Integrity of Protective Material

A. Personal protective equipment must be specific for the tasks performed in the HASP.

B. The Quick Selection Guide to Chemical Protective Clothing provides a quick reference.

5.9 Standard Operating Procedures for Respiratory Protection Devices

A. Checklists for pre-use inspection, reinspection, and periodic inspection.

5.10 Standard Operating Procedures for Personal Protective Clothing

A. Checklists for pre-use inspection and reinspections.

5.11 Specific Levels of Protection for Site

A. Based on anticipated hazards, the specific levels of protection are listed.

1. Level A
2. Level B
3. Level C
4. Level D (or Modified Level D)

B. List all types of personal protective equipment to be used on site for each level.

6.0 MEDICAL SURVEILLANCE REQUIREMENTS

A. Develop a medical surveillance program, as applicable, by a Board Certified or Qualified to be Board Certified Occupational Physician.

6.1 Baseline or Pre-assignment Monitoring

A. Document medical monitoring for personnel working in the Secure Zone.

B. Examinations to include:

- complete medical and work histories
- physical examination
- pulmonary function
- chest X-ray
- electrocardiogram
- eye exam and visual acuity
- audiometry
- urinalysis
- blood chemistry (hematology, serum analyses, heavy metals toxicology)

C. The medical monitoring physical must certify the ability of personnel to use air purifying respirators and to be medically able to perform specific tasks.

6.2 Periodic Monitoring

A. Perform periodic monitoring (medical physical) for personnel working in the secure zone required within the last 12 months.

B. Monitoring documentation maintained on Site.

6.3 Specific Medical Monitoring

A. Monitoring for symptoms related to the possible exposure of harmful chemical compounds.

B. Physical injuries during performance of tasks covered by HASP.

C. Visually monitor personnel for signs of heat or cold overexposure.

6.4 Exposure/Injury/Medical Support

A. Make provisions for special circumstances which may require medical attention of a physician.

7.0 FREQUENCY AND TYPES OF AIR MONITORING AND PERSONNEL AIR SAMPLING

A. The purpose is to identify and quantity airborne contaminants in order to verify and determine the level of personal protection required and protection of the community in accordance with the NYSDOH community air monitoring requirements.

B. Two principal methods:

- Continuous air monitoring using direct reading instrument, (e.g. HNU, combustible gas/oxygen meter.)
- Composite air monitoring obtained by sorbent (e.g. charcoal and silica gel tubes collected by a personal pump).

7.1 Direct-Reading Monitoring Instruments

A. Direct Reading Instruments are used in the Secure Zone.

B. Determine Direct Reading Instrument based on anticipated contaminants and confined space entry requirements.

C. Calibrate instruments each morning and each afternoon.

7.2 Personal Sampling

A. Based on contaminants, identify personal sampling pumps with collection tubes that may be used.

8.0 SITE CONTROL MEASURES

8.1 Buddy System

A. Work in the Secure Zone shall be scheduled to assure no person works alone.

B. Visual contact shall be maintained at all times.

C. Buddy system shall be required when working on or near water hazards including the use of a life line.

D. Appropriate trained personnel (authorized entrants, attendants, entry supervisors and rescue and emergency services) for permit required confined space.

8.2 Site Communications Plan

A. Provide a communication system which includes the following elements.

1. telephones
2. 2-way radios
3. hand signals
4. verbal communication
5. other (horns, whistles)

8.3 Work Zone Definition and Site Access

A. Work zone definition incorporates the following elements:

1. Exclusion Zone
2. Secure Zone
3. Contaminant Reduction Zone
4. Support Zone
5. Control procedures to prevent unauthorized access. Require a check-in and check-out system to control and record each employee and piece of equipment in each area.
6. Site security procedures - (fences, signs, sign in/sign out procedures)

B. Identify on the site map:

1. Exclusion zone, contaminant reduction zone, and support zone.
2. Indicate the sizes of zones, zone boundaries, and access control points into each zone.

8.4 Nearest Medical Assistance

A. Provide the name, address and telephone of nearest medical assistance and location of on site medical assistance (if appropriate).

B. Provide a map to nearest medical facility.

C. Provide written directions to nearest medical facility.

8.5 Safe Work Practices

A. List safe work practices that are mandatory and enforceable at site location.

8.6 Emergency Alarm Procedure

Address site emergencies or occurrences that require immediate actions to prevent additional problems or harm to responders, the public, property or the environment.

A. Establish Site Emergency Procedures

1. List names and emergency functions of on site personnel responsible for emergency actions. Indicate training they have received.
2. Provide communication plan and alternate means for emergency communications.
3. List names, telephone numbers and locations of emergency organizations that might be needed.
4. Address and define procedures for rapid evacuation of personnel.
5. List emergency equipment.
6. Address emergency medical care.
7. Advise site-personnel of their duties in an emergency.
8. Provide for emergency decontamination of injured personnel.
9. Provide a map(s) with route(s) to nearby hospital(s) and pre-arrangements for emergency medical treatment.
10. Coordinate with rescue and emergency services prior to permit entry confined space.

9.0 DECONTAMINATION PLAN

9.1 Standard Operating Procedures

A. Establish decontamination procedures for personnel and equipment.

B. Arrange for proper disposal of contaminated material, solutions and equipment.

Follow specifics as stated in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. NIOSH/OSHA/USCG/EPA;

US Department of Health and Human Services, Public Health Service, Center for Disease Control, NIOSH; 1985.

9.2 Levels of Decontamination Protection Required for Personnel

A. Establish the level of decontamination based on anticipated levels of contaminants.

9.3 Equipment Decontamination

A. Establish decontamination procedures for equipment and arrange for disposal of solutions and/or equipment.

9.4 Disposition of Decontamination Wastes

A. Establish decontamination waste disposal. This includes solutions and/or equipment.

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

A. Provide an Emergency Response/Contingency Plan established with the following objectives:

1. Pre-Emergency Planning
2. Personnel Roles and Lines of Authority
3. Emergency Recognition and Prevention
4. Evacuation Routes and Procedures/Safe Distances
5. Site Security and Control
6. Emergency Decontamination Procedures
7. Emergency Contact/Notification System and Alerting Procedures including alternate means of communication
8. Emergency Medical Treatment Procedures
9. Fire or Explosion Response Procedures
10. Spill or Leak Response Procedures
11. Personal Protective Equipment and Emergency Equipment
12. Rescue and Emergency Services

11.0 SPILL CONTAINMENT PROGRAM

A. Provide a spill containment program identifying possible spill potential and containment procedures and equipment.

1. List emergency contacts and phone numbers
2. List types and location of spill containment materials

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

[END OF SECTION]